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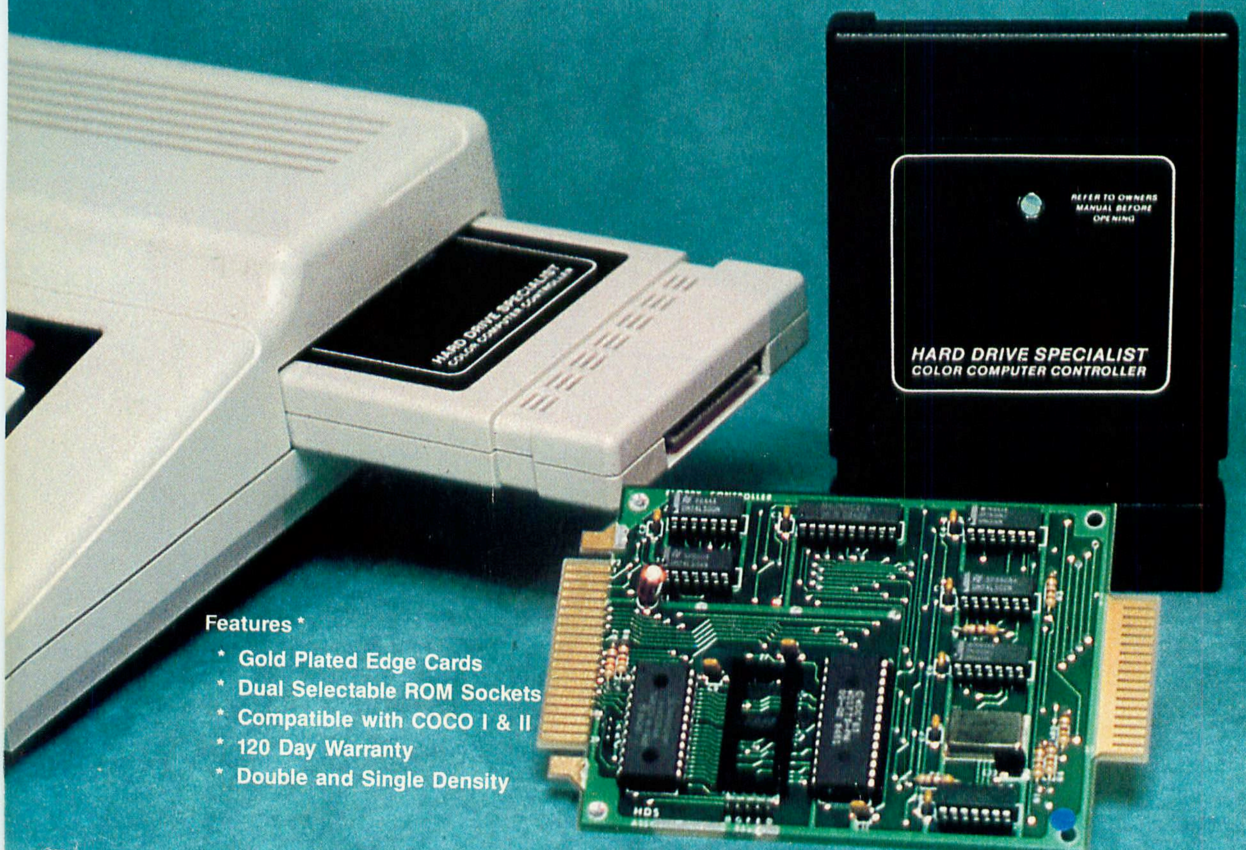
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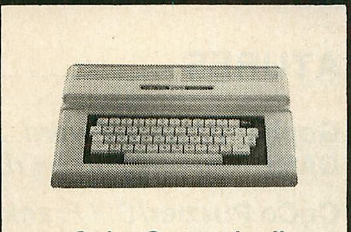

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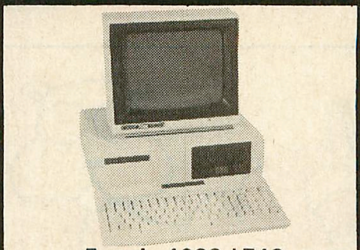

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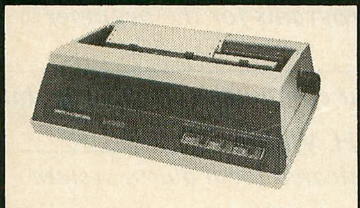

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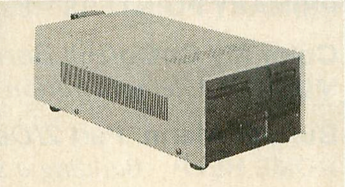

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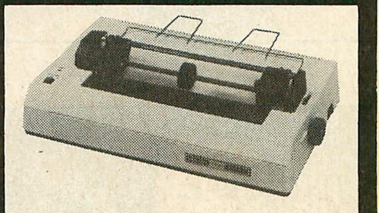

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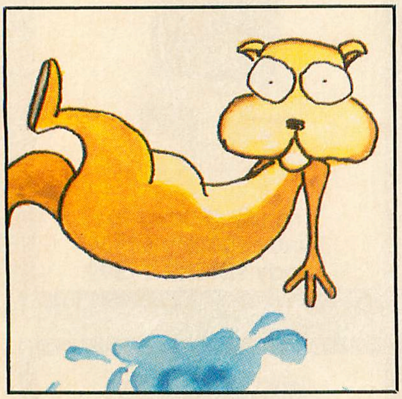
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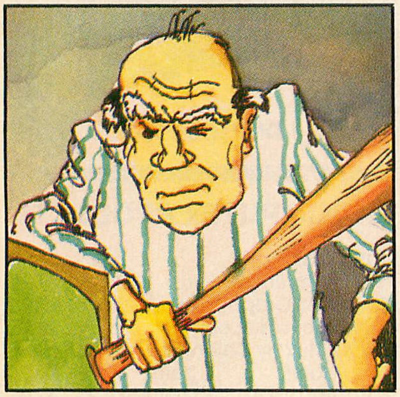
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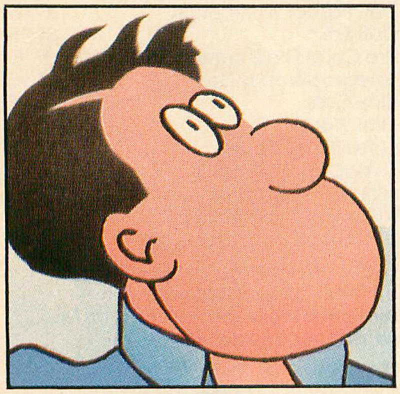
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⊟ The small cassette tape symbols beside features and regular columns indicate that the program listings with those articles are on this month's RAINBOW ON TAPE, ready to CLOAD and RUN. For full details, check our RAINBOW ON TAPE ad on Page 155.

NEXT MONTH: THE RAINBOW and CoCo will pair up to make the perfect couple in February with our Utilities issue. We'll have all kinds of useful helpers, from practical to playful, and we're sure you'll find some to suit your particular needs. Newcomers will be treated to more "light" fare and, as always, we'll keep you informed with reviews of the newest hardware and software products on the market. Give yourself and your Color Computer a big Valentine — THE RAINBOW!

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Dennis Kitsz's manuscript has not arrived, therefore "Custom Color" does not appear in this month's issue.

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January 1986 Vol. V No. 6

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LETTERS TO THE RAINBOW

Fully Packed

Editor:

Here's a little quickie I've never seen in print.

Power down then up again
Load BASIC program
`EXEC 35386`
Now `LIST` the program

You will notice all line numbers have been changed to zeros. The advantage is all line numbers use only the one byte of memory. Thus, for those who wish to pack BASIC programs that much tighter, this technique can be used.

Terry L. Wilson
Baton Rouge, LA

DATA Check

Editor:

For those who write or type in programs containing many lines of `DATA` statements, here is a method of checking to see if the correct number of data entries have been typed.

Following the last `READ` line, insert a temporary line such as `111 READ ZZ$`, then run the program. If you get an error message like this, ?OD ERROR IN 111, you have typed in the correct number of data entries. If you get OK or if the program keeps running, you have typed in too many. Something must have been duplicated by mistake. If you get an ?OD Error in any line before 111, then you have obviously left out some data.

I hope someone finds this useful. It is a small repayment for the pleasure and help I get from THE RAINBOW!

Roger P. Smith
Grande Prairie, Alberta

Grand Computer Grandmother

Editor:

As a fairly new subscriber to THE RAINBOW, I would like to thank you for the pleasure I have gotten from it. First I ordered *Telewriter-64*, which I use for my correspondence and other typing chores, including a monthly letter to my three grandsons in college. To their friends I am known as their "computer grandmother."

I enjoyed Mr. Kolar's articles on the `DRAW` statement [May 1985, Page 144 and June 1985, Page 158]. With the use of the 'S' and 'A' options and Relative coding, I have been making birthday cards for friends and family.

I have also written programs on CD calculations and an amortization program. Each program I write I learn something new about the machine. I must admit that programming and I are not complete strangers as I first learned programming on a UNIVAC II in 1957. So purchasing a CoCo a year ago was a bit of nostaglia. I have a 64K with a DMP-105 printer. I am 76 years young, and still going strong.

Give us more informative articles like the ones by Mr. Kolar, so we can learn more about how our CoCos function. Continued success with THE RAINBOW.

Elizabeth Kahrs
Boynton Beach, FL

A Call to Integrate and Standardize

Editor:

I've owned my Color Computer since early 1981. I'm 53 and use my computer mostly for serious purposes. I've collected about 300 programs for the CoCo over four years. I consider 60 to 70 percent of the programs to be junk! I'm not a programmer, and have little talent or interest for that tedious profession. I'm fascinated by what the computer can do and its promise for tomorrow.

I want more useful, easier-to-use software for my CoCo. I want groups of programs that work together, complement each other, and have more standard methods of operation. You know what I'm writing about — it's called *integrated software*! I must leave it to the professionals which of three routes to take: expansion of single programs, structured sets of programs or the metapho (desk-top) system.

Another point: I would like to see som standardization of explanation in the use o software. You programmers, I am a buye and user of your software. You should tak heed of this because my ideas come fron many hundreds of hours of experience o many programs.

Here are four ideas regarding standardi zation:

1) Provide a functional block diagram o the whole program. The newcomer to th program can more quickly understand th big picture and the flow from menu to menu The occasional user can quickly refresh his, her memory with a block diagram of th program.

2) Provide a complete commands list i one place with a brief explanation. Includ a reference to the text for a full explanatio of each command.

3) Provide a picture or replica of eac menu in the program as it is seen on th computer monitor. A complete explanatio of the menu should follow.

4) Put documentation on 8½ by 11-inc paper. I've received documentation in man sizes. It is a problem to store it in an orderl manner.

Basil G. Garret
Roanoke, T

Missing Address

Editor's Note: We have received many calls from those interested in the MIDI (Musical Instrument Digital Interface) from Intercomp Sound. A letter appeared in the November 1985 issue, Page 6; we inadvertently omitted the company address. So here it is: Intercomp Sound, 129 Loyalist Avenue, Rochester, NY 14624, phone (716) 247-8056. Sorry for our oversight.

Delphi Delight

Editor:

I just received the November 1985 RAINBOW. In the column "Print #-2," I read about Delphi. I think you have a terrific thing going. I have always wanted a modem, and this provides about five more reasons why I should get one. Keep those great ideas coming!

I noticed that Infocom finally decided to get into the "CoCo world." It is a good move on their part. Thanks, Infocom, for supporting us CoCo people! Thank you, RAINBOW, for really being a great magazine.

David Harris
Idaho Falls, ID

BACK TALK

Editor:

In the October 1985 issue [Page 6] of RAINBOW my letter appeared about not being able to get Speech Systems *Musica 2* to print on my C. Itoh Prowriter 8510A printer. As a result, I heard from two terrific fellow Color Computerists. I received, free of charge, both a tape and disk copy of the new 2.7 version of *Musica 2* from Speech Systems. The program now works with my printer! *Musica 2* is an excellent program for composing music, and is now even better since I can produce a hard copy of what I compose. Thanks Speech Systems!

My SMS (Save My Sanity) signal was quickly answered and many life lines thrown to help; it kept me from going down for the third time! My frustration and unhappiness with the program have vanished, and I am high, dry and safely aground with *Musica 2*. Thank you all.

William T. Grace
St. Joseph, MI

Editor:

Two letters by Dan Wolfe and Kenneth Johnson in the November 1985 RAINBOW [Page 6] spoke of problems with disk-based software. The problem of ROM-based programs can be solved by the use of a program called *ROM-FREE* from Prickly-Pear Software. This routine easily moves all ROM programs to disk.

The second problem of using non-disk BASIC on a disk BASIC system can be eliminated by using a program by Herbert S. Schroeder called *Disk-Detach*, from the March 1983 issue [Page 54] of RAINBOW. This program allows you to detach the disk operating system and run under Extended BASIC without removing the disk controller.

These two programs have been a great deal of use to me since I also have children who use our CoCo.

Craig Rothgery
Sheffield Lake, OH

Editor:

In the July 1985 issue [Page 8] there was a request for information about a SAT preparation program for the CoCo and the November 1985 issue [Page 6] contains a response by Dan Wolfe. I purchased this program about a month ago, and would like to pass along a few details. It was written by CBS Software for Tandy Home Education Services. Theoretically, it is sold only as part of a package of a group of software, but some T.H.E.S. managers will sell individual programs.

The programs are nicely put together and provide detailed explanations of the examples. There is, unfortunately, a major bug, so when a student takes the first verbal pretest, skips some questions as recommended in the instructions, then returns and answers them, he comes to the main menu and is told he has now completed pretest 3. I spoke with someone at T.H.E.S. who ran through the program himself with the same result. To get around this bug, it is necessary for the student to quit after the first pretest, enter himself under a new name, and under this second name skip all the answers for the first test until the menu appears and this time choose to complete the third test. (There is no second verbal pretest.) When he has completed the two tests, he must manually figure his own score by totaling the results of his two personae.

It is unfortunate that such an obvious bug was not caught before the program was released. I was given the option of returning the program, but since my daughter thought it was so much more fun than studying from one of the many books available, chose to keep it.

Carol A. Kueppers
Bryn Mawr, PA

Alive and Well

Editor:

The "Print #-2," column in THE RAINBOW for October 1985 was a real relief. I experienced a few days of depression after I had read the "other magazine's" statements regarding my beloved CoCo. I just could not believe it.

I made several trips into my "computer room" to be sure CoCo was still alive and well. Ran off a few hundred labels, used up a long strip of paper making *CoCo Max* drawings, played a few games, fixed up the old checkbook, ran off a statement of tax items for 1985 so far, etc., etc. No, nothing was dead in there. Surely someone was mistaken, after I have invested so much money, time, house space and many a midnight hour of study.

Thank you, RAINBOW, for your encouragement. Long may your colors glow!

Emily McClaine
Hanford, CA

Showing Their Stripes

Editor:

As someone new to the CoCo market, I was impressed at the energy and excitement in evidence at your 1985 Princeton RAINBOWfest. The show provided the perfect opportunity for me to meet people in the CoCo Community and to introduce my new CoCo *Greeting Card Designer* program to both dealers and users.

Zebra Systems is the largest supplier in the Timex/Sinclair Computer market, but Timex sold only about 60,000 of their TS2068 48K Color Computers. Since that market is not very large, TS2068 users do not get the extensive support CoCo owners get, and there is no longer any major magazine dedicated to their needs. Now that we are entering the CoCo market, I see the truth in that old saying, "There's strength in numbers." CoCo users should rejoice in having so many fellow users and in having the likes of RAINBOW and the Princeton RAINBOWfest.

Stewart Newfeld, President
Zebra Systems, Inc.

Database-scaping

Editor:

I run my landscaping business with my CoCo and Gorilla Banana, and do all my own programming. If there is anybody out there who is interested, I have written some good database managers. For more information write to me at 35 West 4th Street, 11746.

R. Flathmann, III
Huntington Station, NY

64K Bit Question

Editor:

In the October 1985 issue, Page 232, the article "Custom Color," by Dennis Kitsz, asked the "64K bit question": "Who can recall the origin of the term 'spool' ?"

S imultaneous
P eripheral
O peration
O n
L ine

Lee Veal
Rowlett, TX

HINTS AND TIPS

Editor:

Some time ago I read when the paint on the CoCo rubs off it is possible to remove all the paint for a nice black finish. Well, in my opinion, the black finish is ugly, so I set out to buy some paint for it. I read that "Mercedes silver gray" [is the best color], but just try to find it! [Instead, I used] Dupli-color brand pewter gray (M) (1977-79 Chrysler Corp.). Looks really authentic. It also has a slight metallic look. This paint is available at Sears' Automotive Department.

Walter Kelsey
Jamaica, NY

Caret Power

Editor:

On Page 238 of the October 1985 issue Richard White made a couple of corrections in the formula for the "Car Payments" article that appeared [on Page 238] of the

June 1985 issue. However, one additional point should have been made for the benefit of *Vip-Calc* users. In *Vip-Calc*, you get the "to the power of" sign not by using the up arrow (↑) but by using the caret (^), which is obtained by pressing CLEAR SHIFT 4.

Robert E. Zielazny
Glen Cove, NY

Tape/Disk Compromise

Editor:

In recent issues of THE RAINBOW, I have read about a controversy concerning whether or not a program should be written for disk or tape, since some programs written for tape simply will not run on a disk-based machine. As a person who owns both, it seems there should be an equitable compromise. I have solved this problem — at least for myself.

First, for all tape-only owners, it is a pain plugging and unplugging a disk controller. This can possibly damage the contacts on the controller and in the past I have turned on my CoCo only to get garbage on the screen after several pluggings and unpluggings.

Second, for all disk owners, I never unplug my controller to run tape-only programs. See if this doesn't work (sorry, this is only for 64K machines). First, bank to the all-RAM mode. Second, `POKE &HC000,&HFF`. Finally, `EXEC &H8000`. The `POKE` changes the first byte of the disk controller's starting address. The `EXEC` executes the Extended BASIC in the computer. When Extended BASIC checks the address &HC000 to see if Disk BASIC is present, it sees an FF and assumes there is no controller plugged in. You get the Extended BASIC logo on the screen, then simply `CLOAD` and `RUN` your program. This works like a charm. Hope this is a fair compromise for the rest of you.

Cletus Piper
East Alton, IL

Typing Paper

Editor:

I am one of the brave souls who type in the program listings each month instead of buying RAINBOW ON TAPE. I've got a hint that will be very important to other typers: buy a few packs of "Post-it" notes. These little pieces of paper are about the same size as the printed 32-column listings. One side has a gummy strip that allows you to stick them down and remove them without tearing the paper. They are excellent for keeping track of where you are in the listing.

Charles Roman
Bellaire, OH

Enjoyed RAINBOWfest

Editor:

I just want to tell you how much I enjoyed the RAINBOWfest at Princeton. This is the second one I attended, and although last year's was great, this year's was greater!

It was also a pleasure to meet Lonnie Falk in person and have a chance to chat. It's always nice to know the boss will go out of his way to be of service.

Hilton N. Wasserman
Little Neck, NY

REQUEST HOTLINE

Editor:

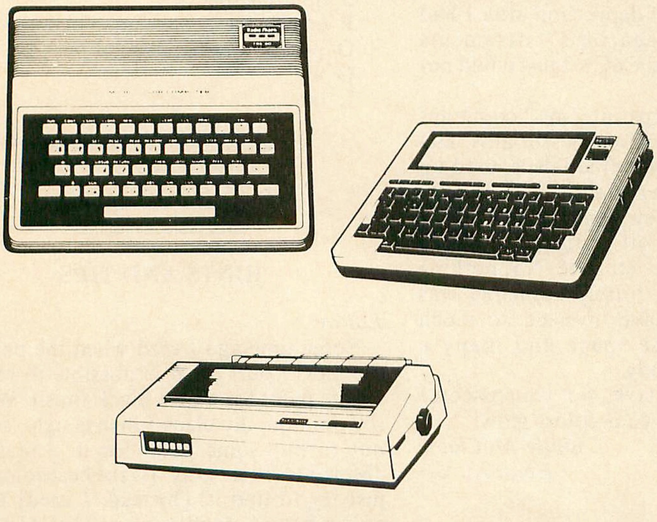
I farm and ranch, and am having a hard time finding programs for ranching operations that I can use on my CoCo. Each of the farm and ranch programs I have seen advertised in other magazines, or for sale in computer stores, is not compatible with my TRS-80 64K Color Computer. Send any information to me at Rt. 1, Box 232-A, 67156.

Dale Markham
Winfield, KS

Editor:

I am having trouble finding dairy programs for the Color Computer. I can find a variety of them for CP/M, and I recall reading advertisements for CP/M in previous issues. Would that make my Color Computer compatible and how good would it work? If I added CP/M and 128K, would

TRS-80 COMPUTER DISCOUNTS



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t be 128K CP/M compatible, or would it e garbage? Do you know of any place I can vrite to get dairy or farm software? Send nformation to 15243 S. 10th Avenue, 93230.

Steve Wiggins
Hanford, CA

Editor's Note: Both Dale Markham and Steve Wiggins can write to *The Computer Farmer*, Kelly Klass, Rt. 1, Box 4133, Twin Falls, ID 83301. Phone (208) 733-4251. He publishes a monthly newsletter devoted to farmers.

CoCo Goes Marching Along

Editor:

I am inquiring about a drill design program for a marching band. I am a member of the North Warren Patriot Marching Band. I especially want one that uses a light pen. If you or any of your readers can help, please write me at Box 693, 07825.

John Perepchuk
Blairstown, NJ

How's the Water?

Editor:

We have a TRS-80 Color Computer and I need to know if there is some way to get a program to analyze water. We have a swimming pool business and the computer just sits in my son's room. If we can use it in the business, I would be very happy. I know it can be used for other things, but I really need it for water analysis. Write to me at 1600 Skypark Drive, 09501.

Charlotte Maynard
Medford, OR

INFORMATION PLEASE

Editor:

I own a Gemini-10X printer and *Scripsit* for my CoCo 2. They are both excellent and work very well. However, I cannot get *Scripsit* to run directly to my printer. If anyone can help me or tell me how to put *Scripsit* onto tape, please write to 241 Duff Drive, 44012.

Dean Wagner
Avon Lake, OH

A Disk Full of Rainbows?

Editor:

Are you ever going to offer RAINBOW ON DISK? I'm a lousy typist and it takes forever to type in all those lines. I bought my CoCo with disk drive — never thought I'd need a cassette player.

Also, does anybody know of a way to get the Tandy/Radio Shack CGP-220 to print near-letter quality? Write to me at Box 1084, USA MEDDAC, 09221.

Faith A. Strunk
APO, NY

Editor's Note: We are kicking the idea around, and considering a "RainbowTech" disk, too. Check out "Building October's Rainbow" — October 1985, Page 16.

Editor:

I own a CoCo 64K, Extended and disk drive in addition to a tape recorder. In order to speed things up, will I be able to transfer the programs to disk? Can you give me advice on the best way to do that? Also, I would like to know if you are interested in subscribers' opinions on matters related to the CoCo and the magazine.

Haskell Brodek
Brooklyn, NY

Editor's Note: There are many tape to disk programs available from both RAINBOW articles and our advertisers. We are always interested in the opinions of our readers.

CoCo Cover

Editor:

I am looking for a top cover for my Color Computer. It is 16K CoCo 2, model 26-3136, the first release of the 16K machine from Korea. The machine is only a year old and Radio Shack does not stock the part any more. The only thing they can give me is the top cover for the newer Color Computer. The screw holes do not line up, and the rear panel is completely different. Maybe one of your readers or advertisers could help. Write to me at 621 Sixth Avenue S, 58201.

Mitch Snyder
Grand Forks, ND

Of Backslashes and Carets

Editor:

When typing in the printed programs, how do we accomplish the slash bar leaning the wrong way (\) or the corporal stripes (^)?

George W. Sturm
Durant, OK

Editor's Note: The backslash (\) is generated by pressing the SHIFT and CLEAR keys simultaneously.

The caret (^) is the printer's representation of an up arrow (↑).

Call Us Indispensable

Editor:

I wish to thank you for helping me with a problem that has plagued my computer, starting four days after the warranty expired.

For months, I put up with lines disappearing from my programs, characters changing by themselves and the keyboard locking up. We tried everything we could to eliminate the problem. Then in the May 1985 RAINBOW, Tony DiStefano mentioned the "Final Fix" for 'F' boards, which is the board I have. I immediately called Radio Shack and the next day my computer was fixed, at no charge. My computer has been working perfectly ever since.

As far as I'm concerned, your magazine is not only great, it's indispensable!

Gay Crawford
Merriam, KS

No Cobwebs Here

Editor:

I have been receiving your magazine for almost two years now and have yet to be disappointed. It has kept my CoCo from gathering dust and cobwebs.

I would like to commend Fred Scerbo for his superbly done job each month through THE RAINBOW "Wishing Well." I greatly enjoyed the "Rockfest" and "Baseball Fever" columns. Keep up the fine work.

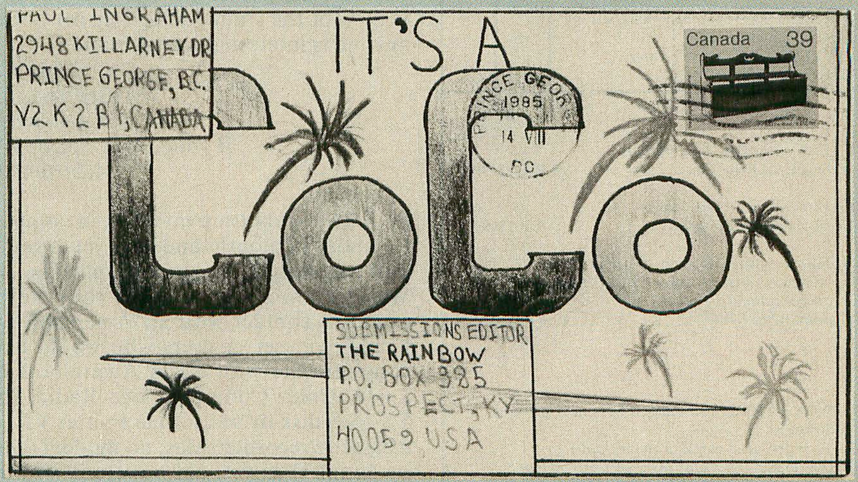
Richard Marshall
N. Miami, FL

PEN PALS

Editor:

I would like to find out how many aerospace/mechanical engineers, like myself, are CoCo users. Anyone interested in sharing their engineering/CoCo interests please

ARTS AND LETTERS



Envelope Of The Month

Paul D. Ingraham
Prince George, British Columbia

drop me a line. Who knows, this might be the start of a CoCo/engineering SIG (special interest group). Write to me at 10111 Versailles Drive, 35803.

Randy Niemann
Huntsville, AL

- Anyone interested in having a pen pal? My address is 191 S.E. Naranja Avenue, 33452.

Derek Abbott
Port St. Lucie, FL

- I am looking for somebody to be pen pals with. My address is 872 Floraville Road, 31520.

Tommy Donovan
Brunswick, GA

- I would like to announce I am starting a pen pal service. You can have a lot of fun with a pen pal. To get started, send $2 to cover postage and tell what kind of computer setup you have. Example: Does it have disk drives or a printer or 64K, etc. Write to me at 1130 Bryden Avenue, 83501.

Leslie Miller
Lewiston, ID

- Anyone interested in having a CoCo pen pal? I am 14 years old. I own a CoCo 2 and a cassette recorder. Write to me at 7489 Kellogg Road, 44077.

Kevin Nasky
Concord, OH

- I am looking for a pen pal. My address is 2836 South Palmer Drive, 29407.

Blake Jurgensen
Charleston, SC

- I have a dream of having a CoCo pen pal from every state. The computer adds much to my life now since I am handicapped. It gives me back my "freedom." My address is 182 Ranger Drive, 29405.

Donna McAdams
Charleston Heights, SC

- I would like to have a pen pal in the U.S.A. or the United Kingdom (or both). If anyone is interested, please write.

Tony Cross
181 Geoffrey Road
Chittaway Pt.
Wyong, New South Wales
Australia 2259

- I have only been involved in computers for about 12 months and have yet to get fully into assembly language and machine code. What I am hopeful of is your help to establish contact with an American Color Computer user or users who would like to communicate with me in Australia. I have a 64K Color Computer, two Radio Shack 5¼-inch disk drives, a Line Printer VIII and a cassette recorder. Alas, no modem (acoustic coupler) as yet, but hopefully within 12 months. I hope to hear from American users soon.

Stephen Walsh
29 Pine Street
Frankston, Victoria
Australia 3200

- I would like to have some pen pals. I own a CoCo I, a Drive 0 and a CGP-115. I am 14 years old. My address is 5908 87th Street E., 98371.

Mark Bell
Puyallup, WA

BULLETIN BOARD SYSTEMS

Editor:

- I am pleased to announce the start of my BBS, which is located in the San Fernando Valley. The number is BBS (818) 886-6041, voice (818) 993-5217. We are a 24-hour BBS dedicated to the CoCo.

Jim Sutemeier
Northridge, CA

- I would like to register my BBS, "Micro World BBS," with your magazine. BBS (813) 677-9530, voice (813) 677-1613.

Jessie A. Ray
Riverview, FL

- I am pleased to announce "The Bayou Board," a Colorama BBS in operation 24 hours a day, seven days a week. Our SysOp is Raymond Barnes. The number is (504) 876-1790.

Wayne Reid
Houma, LA

- This is to inform you of a new BBS called Tele-Net. The hours are 6 p.m. to 7 a.m. Monday through Friday and 24 hours on weekends. Call (718) 727-1781.

Mike Sileo
Glendale, NY

- Our BBS has 300/1200 Baud service. Call (704) 541-3306 24 hours.

Trent P. Condellone
Matthews, NC

- Announcing the newly formed Colorama of Springfield. Our hours of operation are as close to 24 hours as is humanly possible. The number is (513) 399-1262.

Roger K. Holmes
Springfield, OH

- There is a new BBS in Dallas called "The Flying Fortress." Call (214) 686-4796 from 7 a.m. to 10 p.m., seven days a week at 300 Baud.

Eric Hedstrom
Garland, TX

- I would like to inform your readers of a new BBS called MDX-TR. Phone (414) 793-4055. We are online 24 hours a day.

Robert Leberak
Two Rivers, WI

THE RAINBOW welcomes letters to the editors. Mail should be addressed to: Letters to Rainbow, The Falsoft Building, P.O. Box 385, Prospect, KY 40059. Letters should include the writer's full name and address. Letters may be edited for purposes of clarity or space.

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the competition!

STOP & COMPARE!

WORD TRIAD — 3 IN 1 1). POWERFUL WORD PROCESSOR	WORD TRIAD (TM)	BRAND X
Four (4) Screens: 32x16, 51x24, 64x24, 85x24	Yes	
Written in High Performance, Powerful Machine code	Yes	
Available in 16K, 32K, 64 Versions	Yes	
Extended BASIC is NOT Required!	Yes	
"RAM DISC" extra text storage	Yes	
Loads in single load, does not occupy disk	Yes	
Menu-driven disk & cassette I/O	Yes	
Over 100 Support Function Keys	Yes	
Full Screen cursor control with auto repeat keys	Yes	
Compatible with ANY Printer	Yes	
Able to insert Control Codes	Yes	
5 separate printing modes	Yes	
Auto Double column printing	Yes	
Baud rate up to 9,600 baud	Yes	
Each key depression produces a sound, so you just type	Yes	
"Typewriter mode" saves paper	Yes	
"Programmable word/phrase" saves time	Yes	
Displays underlined words on Screen	Yes	
True lower & upper case characters — true descenders	Yes	
Perfect margin justification	Yes	
Auto centering — page numbering	Yes	
NO hardware modifications needed	Yes	
Select lines per page — force new page	Yes	
Three (3) Search modes	Yes	
Recall accidental deletions	Yes	
Block copy & Block move	Yes	
Page forward & Backward in memory	Yes	
"Margin Offset" allows any number of letters pecified — artwork/text combined together.	Yes	
Complete 66 page manual included	Yes	
2). CONVENIENT TERMINAL PROGRAM		
Select Host or terminal mode	Yes	
Upload or Download Programs	Yes	
Talk mode, open/close buffer, auto open/auto close buffer	Yes	
Send control letters, block control codes	Yes	
Use buffer for complete editing	Yes	
Send contents of buffer to printer	Yes	
3). HELPFUL UTILITIES PROGRAM		
Load any program into buffer for examination or changes	Yes	
Edit or examine ANY high level language, such as BASIC	Yes	
Allowed to view ALL the Computer's memory	Yes	
Language function key to help make writing high level language easier	Yes	
"RAM TEST," a complete memory diagnostic program	Yes	

WORD TRIAD™

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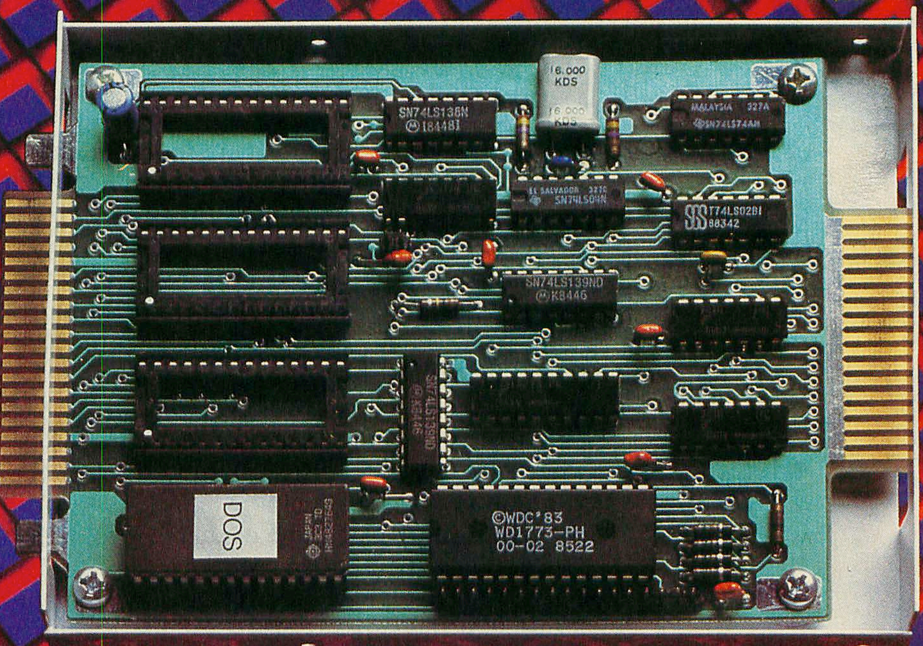
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- EPROMS are software selectable.
- Internal Mini-Expansion Bus interface for;
  - 80 Columns
  - Real Time Clock and/or
  - Parallel Printer or
  - EPROM Programmer or
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- New technology, no adjustments needed.
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- Needs +5 volts only, works on all COCOs or COCO IIs.

EXPANSION ADD-ONS:

There are currently four add-ons available from DISTO for this controller;

PPRINT

The first is a Centronics Compatible Parallel Printer adapter. This adapter will allow you to connect a Centronics compatible printer directly to your controller, leaving the serial port of your computer free for your modem. Printer driver software included.

RTIME

The second is a Real Time Clock. This is a clock chip that will keep the proper time, date and year. A small battery keeps the time when the Computer is off, retreive and set the time by using simple Basic POKES. Also available with the Real Time Clock is the optional Centronics Compatible Parallel Printer adapter. Software to set the clock and printer driver included.

MPROM

The third is a Mini EPROM Programmer. Yes, a low cost programmer that attaches to the disk controller. A must for the DISTO Super Controller. Program those often used utilities into EPROM and plug them directly into your controller. Will program 2764's or 27128's, a perfect mate for the DISTO Super Controller.

DISPLAY80

The fourth is a real knock-out. This is a three in one card. It's major function is to add an 80* 24 display to your computer. A feature packed package also includes RTIME and PPRINT. All in one neat package that fits inside the controller. OS9 software available. Call for more information.

CREDITS:

The DISTO Super Controller, add-ons and all its documentation are conceived and designed by Tony Distefano. The DISTO Super Controller and add-ons are manufactured and distributed by; C.R.C. COMPUTER INC.
10802 Lajeunesse, Montréal, Québec, Canada H3L 2E8 1-514-383-5293

*DISTO and CRC Computers are registered trade marks. The DISTO Super Controller and add-ons are copywrited by *DISTO*.

PRINT#-2,

I have, honestly, been having more fun in the past month than I have had in a long time. Just a couple of months ago, in announcing our plans with the Delphi Information System, I said that I thought it opened new worlds to both us and to you. Was that ever an understatement!

It has been almost like a RAINBOWfest every night. What is especially great is being able to talk to people all over the country — and other countries, as well — in "real time" through the conference feature in the Color SIG. And we've sponsored some "topic" conferences, too, with notables such as Steve Bjork, Dan Downard and Brian Lantz. One night we even had a group of CoCo owners from Argentina on as special guests.

It's really great to see people leaving messages in the forum and getting answers to questions almost right away. This is a great example of the CoCo Community — people helping people solve problems. We've also had some neat poll results, and some excellent programs for you to download.

I am really pleased that the response to the Color SIG on Delphi has been so good — and so overwhelming. It has created a few problems, though, but they are problems we are ironing out. What we've seen is slow response time on occasions and inability to logon at all in a few cases. We've been quick to point this out to Delphi, and they have been quick to work on fixing things.

Another problem has been getting manuals to those who have ordered them. It seems to be a common problem with almost any outside people who deal with THE RAINBOW. Whether it is a hotel hosting a RAINBOWfest, or Delphi, or whatever, we tell them what sort of numbers they will be dealing with. Usually they think we are overstating our case. So far we have not.

Just one of those things, I guess. But, by now, things should be better and they will continue to get better. Come visit us on Delphi.

* * *

I do want to remind you that we have a special subscription renewal offer available for all renewals postmarked by December 31, 1985. No, we're not raising subscription prices this year, but we will discount RAINBOW binders (one set of two binders hold a full year) by more than 18 percent if you renew by the deadline. Even if you have just subscribed — or just renewed — you can do it again and get a set of binders for $11 (plus $2.50 shipping and handling to a street address or $4.50 foreign or to a post office box).

Both orders (for binders and renewal) have to come in together and your order must be postmarked by December 31, 1985.

Telewriter-64™

the Color Computer Word Processor

- **3 display formats: 51/64/85 columns × 24 lines**
- **True lower case characters**
- **User-friendly full-screen editor**
- **Right justification**
- **Easy hyphenation**
- **Drives any printer**
- **Embedded format and control codes**
- **Runs in 16K, 32K, or 64K**
- **Menu-driven disk and cassette I/O**
- **No hardware modifications required**

THE ORIGINAL

Simply stated, Telewriter is the most powerful word processor you can buy for the TRS-80 Color Computer. The original Telewriter has received rave reviews in every major Color Computer and TRS-80 magazine, as well as enthusiastic praise from thousands of satisfied owners. And rightly so.

The standard Color Computer display of 32 characters by 16 lines without lower case is simply inadequate for serious word processing. The checkerboard letters and tiny lines give you no feel for how your writing looks or reads. Telewriter gives the Color Computer a 51 column by 24 line screen display with *true lower case characters*. So a Telewriter screen looks like a printed page, with a good chunk of text on screen at one time. In fact, more on screen text than you'd get with Apple II, Atari, TI, Vic or TRS-80 Model III.

On top of that, the sophisticated Telewriter full-screen editor is so simple to use, it makes writing fun. With single-letter mnemonic commands, and menu-driven I/O and formatting, Telewriter surpasses all others for user friendliness and pure power.

Telewriter's chain printing feature means that the size of your text is never limited by the amount of memory you have, and Telewriter's advanced cassette handler gives you a powerful word processor without the major additional cost of a disk.

> *...one of the best programs for the Color Computer I have seen...*
> — Color Computer News, Jan. 1982

TELEWRITER-64

But now we've added more power to Telewriter. Not just bells and whistles, but major features that give you total control over your writing. We call this new supercharged version Telewriter-64. For two reasons.

64K COMPATIBLE

Telewriter-64 runs fully in any Color Computer — 16K, 32K, or 64K, with or without Extended Basic, with disk or cassette or both. It automatically configures itself to take optimum advantage of all available memory. That means that when you upgrade your memory, the Telewriter-64 text buffer grows accordingly. In a 64K cassette based system, for example, you get about 40K of memory to store text. So you don't need disk or FLEX to put all your 64K to work immediately.

64 COLUMNS (AND 85!)

Besides the original 51 column screen, Telewriter-64 now gives you 2 additional high-density displays: 64 × 24 and 85 × 24!! Both high density modes provide all the standard Telewriter editing capabilities, and you can switch instantly to any of the 3 formats with a single control key command.

The 51 × 24 display is clear and crisp on the screen. The two high density modes are more crowded and less easily readable, but they are perfect for showing you the exact layout of your printed page, *all on the screen at one time*. Compare this with cumbersome "windows" that show you only fragments at a time and don't even allow editing.

RIGHT JUSTIFICATION & HYPHENATION

One outstanding advantage of the full-width screen display is that you can now set the screen width to match the width of your printed page, so that "what you see is what you get." This makes exact alignment of columns possible and it makes hyphenation simple.

Since short lines are the reason for the large spaces often found in standard right justified text, and since hyphenation is the most effective way to eliminate short lines, Telewriter-64 can now promise you some of the best looking right justification you can get on the Color Computer.

FEATURES & SPECIFICATIONS:

Printing and formatting: Drives any printer (LPVII/VIII, DMP-100/200, Epson, Okidata, Centronics, NEC, C. Itoh, Smith-Corona, Terminet, etc).

Embedded control codes give full dynamic access to intelligent printer features like: underlining, subscript, superscript, variable font and type size, dot-graphics, etc.

Dynamic (embedded) format controls for: top, bottom, and left margins; line length, lines per page, line spacing, new page, change page numbering, conditional new page, enable/disable justification.

Menu-driven control of these parameters, as well as: pause at page bottom, page numbering, baud rate (so you can run your printer at top speed), and Epson font. "Typewriter" feature sends typed lines directly to your printer, and Direct mode sends control codes right from the keyboard. Special Epson driver simplifies use with MX-80.

Supports single and multi-line headers and automatic centering. Print or save all or any section of the text buffer. Chain print any number of files from cassette or disk.

RAINBOW
CERTIFICATION
SEAL

File and I/O Features: ASCII format files — create and edit BASIC, Assembly, Pascal, and C programs, Smart Terminal files (for uploading or downloading), even text files from other word processors. Compatible with spelling checkers (like Spell 'n Fix).

Cassette verify command for sure saves. Cassette auto-retry means you type a load command only once no matter where you are in the tape.

Read in, save, partial save, and append files with disk and/or cassette. For disk: print directory with free space to screen or printer, kill and rename files, set default drive. Easily customized to the number of drives in the system.

Editing features: Fast, full-screen editor with wordwrap, block copy, block move, block delete, line delete, global search and replace (or delete), wild card search, fast auto-repeat cursor, fast scrolling, cursor up, down, right, left, begin line, end line, top of text, bottom of text; page forward, page backward, align text, tabs, choice of buff or green background, complete error protection, line counter, word counter, space left, current file name, default drive in effect, set line length on screen.

Insert or delete text anywhere on the screen without changing "modes." This fast "free-form" editor provides maximum ease of use. Everything you do appears immediately on the screen in front of you. Commands require only a single key or a single key plus CLEAR.

> *...truly a state of the art word processor... outstanding in every respect.*
> — The RAINBOW, Jan. 1982

PROFESSIONAL WORD PROCESSING

You can no longer afford to be without the power and efficiency word processing brings to everything you write. The TRS-80 Color Computer is the lowest priced micro with the capability for serious word processing. And only Telewriter-64 fully unleashes that capability.

Telewriter-64 costs $49.95 on cassette, $59.95 on disk, and comes complete with over 70 pages of well-written documentation. (The step-by-step tutorial will have your writing with Telewriter-64 in a matter of minutes.)

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Apple II is a trademark of Apple Computer, Inc.; Atari is a trademark of Atari, Inc.; TRS-80 is a trademark of Tandy Corp; MX-80 is a trademark of Epson America, Inc.

By the time you read this, we will have moved to the new Falsoft Building. As you know, I have to write these columns some time in advance, so as I write this, the move is set for five days in the future.

For a number of reasons, we may not make it exactly when we are supposed to, but, for sure, by the time you read this we should be happily established in our new offices! I can't wait, and neither can anyone else: We've long outgrown our present offices and the new ones will even give us some room to do a little growing.

> ***"What is especially great is being able to talk to people all over the country — and other countries, as well — in 'real time' . . ."***

Once things get settled down, and we have time to catch our breath from the holiday season, we're going to have that long-promised "official" dedication/opening. Once we do, I hope as many of you will come as possible. I'll let you know when it is going to be as soon as it is all figured out.

* * *

With the arrival of the new building comes something else new, a magazine: *VCR — The Home Video Monthly.* You should find a subscription form for it inside this month's issue of THE RAINBOW (Page 57).

VCR is due right after the first of the year. It will be a bit different from most of the video magazines you see now because it will be dedicated primarily to software. There will be lots of reviews, a bunch of nostalgia pieces, some trivia and the like. In short, ***VCR*** will be a lot like THE RAINBOW in that it will be dedicated to what you are using a VCR for.

If you have a VCR, try out ***VCR***. I think you will like what you see.

* * *

I happen to think 1986 is to be a sensational year for all of us in the CoCo Community.

One thing it will certainly do is swell the ranks of our community again — with people who have acquired new Color Computers during the holidays. But, this will only be the first of two significant events to occur.

Look for the second one sometime between April and June or so. That's when I expect (don't know for sure, but suspect) that Tandy will dazzle us with the "new" CoCo.

Yes, I believe 1986 is going to be a banner year!

— Lonnie Falk

fss FOUR STAR SOFTWARE

SHRINKER
This is a very useful disk utility that will help eliminate wasted disk space. Shrinker will take a series of small programs saved on disk and convert them to a space-saving format. Why waste one whole granule of disk space if the program only requires part of one? Disk access will remain the same, the program is RS DOS compatible, and very easy to use. No hassles, just improved use of disk space and more money in your pocket!
DISK $16.95 (U.S.) $19.95 (CDN.)

GALACTIC FIGHTER
A fast-paced arcade game with great graphics and sound. CoCo at its best!
Save earth by fighting your way to Dracoz, the home world of the invaders. Fly earth's secret weapon, 'The Galactic Fighter'.
32K, one joystick required.
CASS $19.95 (U.S.) $24.95 (CDN.)
DISK $24.95 (U.S.) $29.95 (CDN.)

BUGS II
An adventure game with all the excitement of arcade action.
Earth is infested with intelligent killer bugs. Find your way through the maze and destroy the reactor.
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COCO PAINT
A very advanced, easy-to-use graphics development system for a 64K , single-drive CoCo!
- Supports: keyboard, single joystick, mouse or X-pad
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OS-9 UTILITIES
This is a set of three separate utility groups for use with the OS-9 disk operating system. You may purchase one of the groups separately, or buy two or three and save!
Group No. 1
Contains a series of utilities for programmers. It includes the following:
HEAD - displays a variable number of lines starting at the top of a file.
TAIL - displays a variable number of lines at the end of a file.
MV - moves a file from one directory or disk to any other directory or disk.
PRL - prints a formatted file listing that will add line numbers, pagination, etc.
FF - creates a list of functions from a "C" source listing
MERGE - will merge one or more files together into one single file
Group No. 2
A series of helpful general utilities for all OS-9 users and programmers. Included are:
HELP - disk resident help system that avoids tying up valuable memory but that provides on-line help descriptions of almost all OS-9 commands that are commonly found in the OS-9 system and popular system upgrades
UNIT - this utility provides descriptions, units, and constant conversion factors for hundreds of scientific and technical terms, measures, constants, etc.
ERR - provides on-line descriptions of numeric error codes. Does not take any extra memory as the normal error routine does.
Group No. 3
This third group of utilities is written in BASIC09. It includes:
FILEDEL - will prompt you for deletions of all files resident on a disk without repetitive typing of file and path names.
DISKID - allows users to quickly review and/or change disk ID status.
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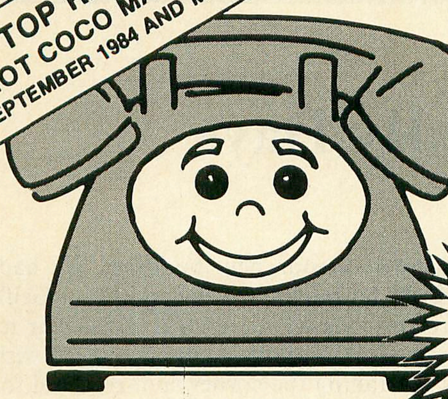
TOP RATINGS
HOT COCO MAGAZINE
SEPTEMBER 1984 AND MAY 1985



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AND MOST LOVABLE

GOOD LOOKIN'

AUTOTERM shows true upper/lower case in screen widths of 32, 40, 42, 51, or 64 characters with no split words. The width of 32 has extra large letters. Scrolling is forward, backward, and fast. Block graphics pictures are displayed automatically and can be scrolled.

The screen's top line shows operating mode, unused memory size, memory on/off, and caps-lock on/off. It also gives helpful prompts.

SWEET TALKIN'

KEY-BEEP can be on/off. Unacceptable keystrokes cause a lower pitched BOP! This ERROR-BEEBOP can be on/off.

Talks to other computers with Full or Half Duplex; Baud Rate of 110, 150, 300, 600, 1200; Parity as even, odd, mark, space, none; 7 or 8 bit Word; any Stop Bits; all 128 ASCII characters; true line Break; XON/XOFF protocol; and optional line-at-a-time transmission. Able to send and receive text, block graphics, BASIC and ML programs. A 64K machine holds up to 45,000 characters (33,300 in HI-RES).

DUAL PROCESSING lets you review & edit while more data is coming in.

XMODEM for disk file transfer.

Fully supports D.C. Hayes and other intelligent modems.

Talks to your printer with any page size, margins, line spacing, split word avoidance. Embed your printer's control sequences for boldface, underlining, etc. Narrow text can be automatically spread out.

You'll also use Autoterm for simple word processing and record keeping

You can display directories, delete files, transmit directly from disk, and work with files larger than memory. Easily maintain a disk copy of an entire session.

Compatible with TELEWRITER (ASCII) & other word processors.

SMOOTH WALKIN'

AUTOTERM moves smoothly and quickly between word processing and intelligent terminal action. Create text, correct your typing errors; then connect to the other computer, upload your text, download information, file it, and sign-off; then edit the received data, print it in an attractive format, and/or save it on file.

Editing is super simple with the cursor. Find strings instantly, too! Any operating parameter, such as screen width, can be altered at any time. Uncompleted commands can be cancelled.

PUTTY IN YOUR HANDS

The word processor can be used to create, print, and/or save on file your personal KSMs. They let AUTOTERM act like you. For example, it can dial through your modem, sign-on, interact, perform file operations, & sign-off; an entire session without your help. KSMs can answer the phone, prompt the caller, take messages, save them, hang-up, and wait for the next call. The KSM potential is unbelievable!

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Graham, *RAINBOW*, 6/83

"The AUTOTERM buffer system is the most sophisticated — and one of the easiest to use..."
Banta, *HOT CoCo*, 9/84

"Almost a full featured word processor..."
Ellers, *RAINBOW*, 11/84

"AUTOTERM's excellent error-handling routines, thorough documentation, and logical, easy-to-use command structure make it stand out."
Parker, *HOT CoCo*, 5/85

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by Jeff Stevens

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by John Ashurst

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BUILDING A RAINBOW

Our Sally Days

We had long expected to move to our new building. We had not suspected that Sally would be moving elsewhere. Sally Gellhaus, THE RAINBOW's art director, has left us after a three-year tenure because her husband has accepted a new job in another city. While we wish her the very best, it seems a shame she is not taking the corner spot reserved for her in the brand-spanking new Falsoft Building, the house that RAINBOW built.

After all, Sally is one of the primary builders of THE RAINBOW. When she joined the staff, unmarried and right out of college, THE RAINBOW, while growing rapidly, was still a ragtail operation, little more than a family affair in Lonnie Falk's basement. What changes we have gone through in THE RAINBOW's "Sally" days.

While THE RAINBOW was born in an upstairs bedroom, a few of us recall when the dining room at the Falk residence was, more or less, corporate headquarters. Then, the basement became a bustling office. In those hectic days, it became routine to literally step over somebody just to move about. The pathway to Lonnie's office was an obstacle course and I had to scoot back from my card table desk to give room to pass every time someone came down the basement steps. A lot of Sally's best design work was laid out on the carpet. She was like a kid with her first bicycle the day she got her own light table.

Is it any wonder that THE RAINBOW's first move to a shopping center storefront, a former beauty parlor, seemed like quite a step up? Now, we would have elbow room, space to grow. Sally placed her light table next to capped water pipes that only recently led to shampoo sinks. Nestled between the Prospect post office and a drugstore, THE RAINBOW offices had become a separate entity, no matter that Lonnie now had to drive a mile to work instead of just saunter down the stairs.

Sally drew up the new office layout when continued growth led to our next expansion. Actually, Sally stayed put — though she now obtained room for a desk. It was the business department that moved to the new location, a former restaurant located right on the other side of the post office. Now surrounded by Falsoft offices, the postmaster bought himself a CoCo.

It was in these shopping center offices that our PCM, SCORECARD and SOFT SECTOR publications were conceived and Sally, in the role of creative director, played a key role in each publication's development. And, it was sitting at a desk where rows of hair dryers once stood that Sally fretted over the layout of office space that, at long last, was being designed especially for her art department. She allocated for herself a bright, second-floor corner of the 23,000-sq. ft. "Prospect high-rise." We hope she'll visit us often and take in the view from that window. She's welcome anytime in the Falsoft Building; indeed, she's part of its very foundation.

On her last day here, Friday, November 15, when the movers came to take us to our new quarters, the publishing company that started as a two-sheet newsletter had 50-plus staffers and was producing books and tapes in addition to three monthly computer magazines and a sports weekly, as well as launching a home video magazine. Sally, who in those early days *was* the art department, now supervised four full-time designers and we were hiring more. Yes, we have the size and the momentum to carry on now without Sally, but her imprint has been strong. Thumbing through the magazine, I can spot her influence on most every page of THE RAINBOW.

A few nights ago, after warm hugs and misty-eyed best wishes, several of us walked Sally to her car. As she drove off to a new life in another town, and as we walked across the parking lot to the new building, a memorable chapter was closed in THE RAINBOW logbook and a new page was begun.

— Jim Reed

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'GOPHER'IT!

Three things must be understood in order to play this game:

1) Farmers grow turnips;
2) Gophers love turnips;
3) Farmers hate gophers!

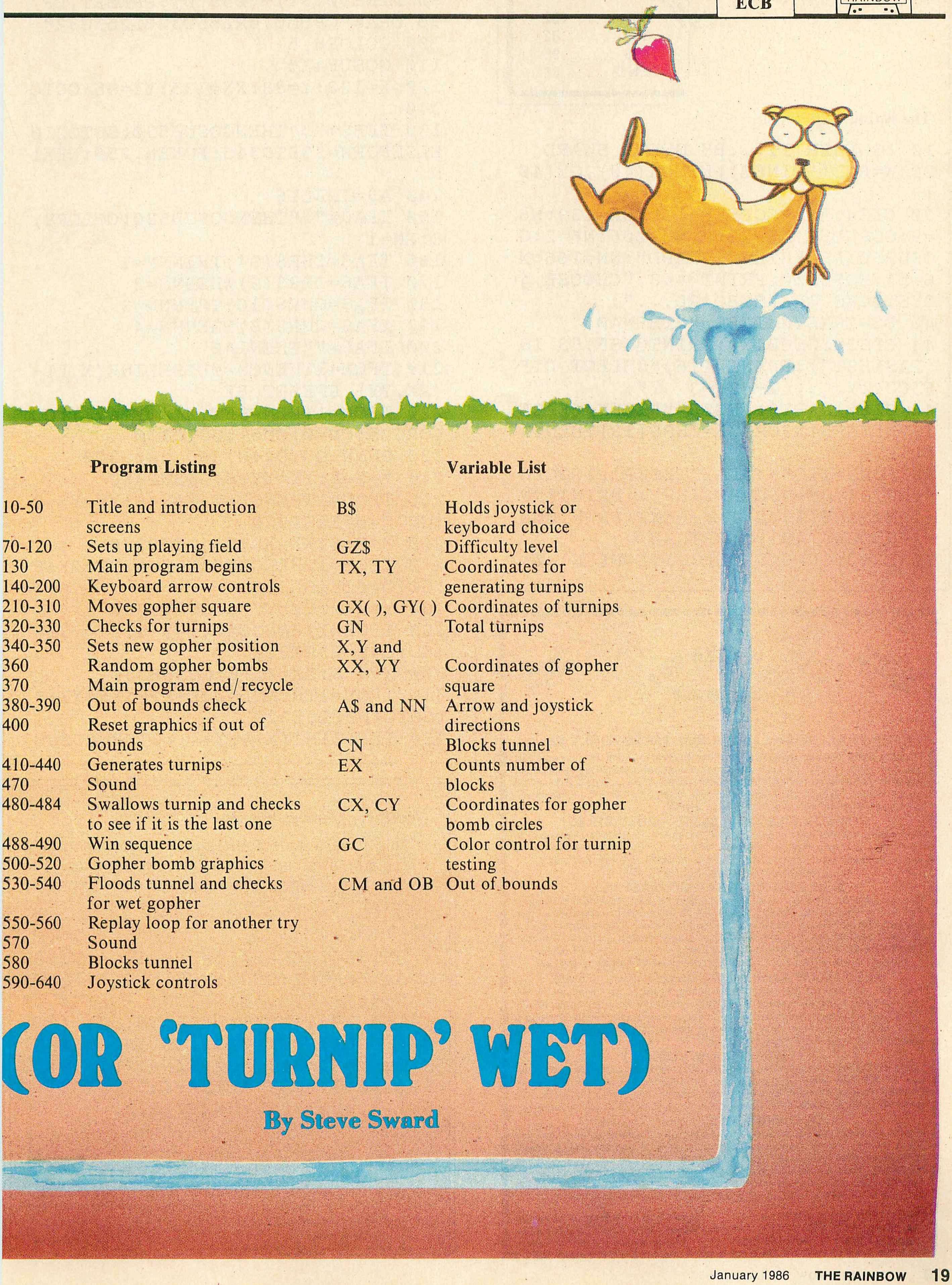
To enter this 16K ECB game, simply `CLOAD "GOPHERIT"` and `RUN`. You are asked to choose either keyboard or joystick control and a difficulty level. The object of *Gopher It* is for you (the gopher) to eat all the turnips before the farmer can drown you inside your tunnel. The farmer has two weapons, gopher bombs and a very wet hose. To move, use either the right joystick or the keyboard arrows. To help you stay dry (and alive), you can block the tunnel three separate times by pressing the space bar (or joystick button).

Caution: Travel above ground can be very hazardous to gophers. Use your blocks wisely. If you get flooded out, hit the space bar (or joystick button) to reset the game.

At the heart of this program is the versatile `PPOINT` color test feature of Extended Color BASIC. Lines 320 and 330 detect the presence of an adjacent turnip (addition sign, '+') while lines 480 and 484 search the turnip array for any remaining plants (to see if you have won). The other key statement, of course, is the `PAINT` command, which eliminates what would otherwise be a programming nightmare.

Should you win and wish to play again, hit the BREAK key and "gopher it"!

(Steve Sward is a captain in the U.S. Air Force and serves at Offutt Air Force Base. He has been programming since 1980 and this is his first published program. Steve, his wife Carla and two children live in Bellevue, Nebraska.)



Program Listing	
10-50	Title and introduction screens
70-120	Sets up playing field
130	Main program begins
140-200	Keyboard arrow controls
210-310	Moves gopher square
320-330	Checks for turnips
340-350	Sets new gopher position
360	Random gopher bombs
370	Main program end/recycle
380-390	Out of bounds check
400	Reset graphics if out of bounds
410-440	Generates turnips
470	Sound
480-484	Swallows turnip and checks to see if it is the last one
488-490	Win sequence
500-520	Gopher bomb graphics
530-540	Floods tunnel and checks for wet gopher
550-560	Replay loop for another try
570	Sound
580	Blocks tunnel
590-640	Joystick controls

Variable List	
B$	Holds joystick or keyboard choice
GZ$	Difficulty level
TX, TY	Coordinates for generating turnips
GX( ), GY( )	Coordinates of turnips
GN	Total turnips
X,Y and XX, YY	Coordinates of gopher square
A$ and NN	Arrow and joystick directions
CN	Blocks tunnel
EX	Counts number of blocks
CX, CY	Coordinates for gopher bomb circles
GC	Color control for turnip testing
CM and OB	Out of bounds

(OR 'TURNIP' WET)

By Steve Sward

130	162
340	83
490	95
END	88

The listing: GOPHERIT

```
10 'GOPHER IT...BY STEVE SWARD
20 W=RND(-TIMER):DIMGX(40),GY(40
)
30 CLS4:A$="GOPHER IT":NN=139:N6
=9:GOSUB50:A$="BY":NN=206:N6=2:G
OSUB50:A$="STEVE SWARD":NN=266:N
6=11:GOSUB50:PRINT@448,"CHOOSE j
OYSTICKS OR kEYBOARD...";
40 B$=INKEY$:IFB$=""THEN40
44 CLS3:GOSUB470:PRINT@489,"3 IS
 EASIEST";:PRINT@416,"SELECT DIF
FICULTY...  1--2--3  ?";
46 GZ$=INKEY$:IFGZ$=""THEN46ELSE
IFVAL(GZ$)>3ORGZ$=CHR$(13)THEN44
ELSE70
50 FORN=1TON6:PLAY"T200P1P1O3CEG
":PRINT@NN+N,CHR$(159);:PRINT@NN
-1+N,MID$(A$,N,1);:NEXT:PRINT@NN
-1+N,CHR$(191);:RETURN
70 EX=0:GN=0:PMODE3,1:SCREEN1,0:
PCLS(8)
80 LINE(0,31)-(255,0),PRESET,BF
90 DRAW"C8BM0,0R255D32BL255U32"
100 COLOR6,5
110 GOSUB410
120 X=128:Y=88:XX=135:YY=95:GOTO
340
130 IFB$="J"THENGOSUB590:GOTO210
ELSEFORN=338TO345:POKEN,255:NEXT
N
140 A$=INKEY$
150 IFA$=" "THENGOSUB580:COLOR8,
8:CN=1
160 IFA$=CHR$(94)THENNN=1
170 IFA$=CHR$(9)THENNN=2
180 IFA$=CHR$(10)THENNN=3
190 IFA$=CHR$(8)THENNN=4
200 IFA$=""THEN140
210 IFCM=1THENCM=0ELSELINE(X,Y)-
(XX,YY),PRESET,BF
220 IFCN=1THENPSET(X+4,Y+4,1):CO
LOR6,5:CN=0:CM=1:GOTO130
230 ONNN GOTO240,260,280,300
240 Y=Y-8:YY=YY-8:GOSUB380
250 IFOB=1THENOB=0:Y=Y+8:YY=YY+8
:GOTO400ELSE320
260 X=X+8:XX=XX+8:GOSUB380
270 IFOB=1THENOB=0:X=X-8:XX=XX-8
:GOTO400ELSE320
280 Y=Y+8:YY=YY+8:GOSUB380
290 IFOB=1THENOB=0:Y=Y-8:YY=YY-8
:GOTO400ELSE320
300 X=X-8:XX=XX-8:GOSUB380
310 IFOB=1THENOB=0:X=X+8:XX=XX+8
:GOTO400ELSE320
320 IFPPOINT(X+4,Y+4)=2THENGOSUB
```

One-Liner Contest Winner . . .

This program demonstrates Lissajous patterns, which are used on an oscilloscope to check the accuracy of a signal generator against a frequency standard.

The listing:

```
1 PMODE4:SCREEN1:FORA=1TO4:FORB=
1TO4:FORJ=1TO500:NEXT:PCLS:LINE(
130,50)-(238,50),PSET:LINE(50,95
)-(50,177),PSET:LINE(50,50)-(50,
50),PSET:FORT=0TO6.3STEP.05:X=SI
N(T*A)*30+50:Y=50-SIN(T*B)*30:PS
ET(130+17*T,Y):LINE-(X,Y),PSET:P
SET(X,95+13*T):NEXTT,B,A
```

Jeff Millington
Flint, MI

(For this winning one-liner contest entry, the author has been sent copies of both *The Second Rainbow Book Of Adventures* and its companion *The Second Rainbow Adventures Tape.*)

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"Double-Entry" General Ledger Accounting System for home or business: 16k, 32k, 64k. User-friendly, menu-driven. Program features: balance sheet, income & expense statement (current & 'YTD'), journal, ledger, 899 accounts & 2350 entries on 32k & 64k (710 accounts & entries on 16k) (disk only). Version 1.2 has screen printouts. Rainbow Reviews 1.1 - 9/84 : 1.2-4/85

"OMEGA FILE" Reg. $69.95—ONLY $19.95

Filing data base. File any information with Omega File. Records can have up to 16 fields with 255 characters per field (4080 characters/record). Sort, match & print any field. User friendly menu driven. Manual included (32k/64k disk only). Rainbow Review 3/85, Hot CoCo 10/85

BOB'S MAGIC GRAPHIC MACHINE

Can generate BASIC code to use in your programs. Easy drawing and manipulation of circles, elipses, boxes, lines and ARCS. Single joystick operation with on line HELPS at all times. Allows text on the graphics screen & movement of objects on the screen. Can be used as a stand-alone graphics editor. Instruction Manual. **GRAPHICS EDITOR.Reg. $39.95—ONLY $19.95** for disk or tape. 64k ECB. Rainbow Review 7/85, Hot CoCo 9/85 **"The graphics bargain of the year"**

'KEEP-TRAK' Accounts Receivable. (Avail. 10/01/85).

Features: auto interest calculation, auto ageing of accounts, installment sales, total due sales, explanation space as long as you need, detailed statements, 'KEEP-TRAK' General Ledger tie in, account number checking, credit limit checking & more. User friendly/menu driven. Includes manual. **$39.95** or **$49.95** General Ledger & Accounts Receivables. (Disk Only).

OS9 UTILITY DISK

Contains: Transfer utilities between RSDos and OS9 which also allows manipulation of RS files with OS9 programs. EXPANDABLE MULTILEVEL HELP. CPTREE—copies directory structures with no temp. files. Two calculators, plus ten other utilities. **$19.95** (Disk Only—Available 10/15/85) OS9 is Microware TM.

'COCO WINDOWS' Available 10/31/85

With hi-res character display and window generator. Features an enhanced key board (klicks) and 10 programmable function keys. Allows the user to create multiple windows from basic. Includes menu driven printer setup and auto line numbering. Four function calculator. with memory. The above options can be called anytime while running or writing in BASIC. APPLE PULL YOUR DRAPES, YOU DON'T WANT TO SEE THIS. **$19.95** (disk or tape) includes manual.

THE OTHER GUY'S SOFTware
P.O. Box H, 55 N. Main
Logan, UT 84321 (801) 753-7620

(Add $2.50 for postage & handling)
C.O.D., Money Order, Check in U.S. Funds
(Please specify if J&M controller)

```
480
330 IFY<31ANDPPOINT(X+4,Y+4)=4TH
ENGOSUB480
340 LINE(X,Y)-(XX,YY),PSET,BF
350 PLAY"V31O3T200CEG"
360 IFRND(10)=10THEN500
370 GOTO130
380 IFX<0ORX>248ORY<0ORY>184THEN
OB=1
390 RETURN
400 LINE(X,Y)-(XX,YY),PSET,BF:PL
AY"V31T50O2CP1C":GOTO130
410 FORTX=4TO252STEP8:FORTY=4TO1
88STEP8
420 IFRND(VAL(GZ$)*20+20)<>1THEN
440
430 PLAY"T200O4CEG":GN=GN+1:GX(G
N)=TX:GY(GN)=TY:IFTY<31THENCIRCL
E(TX,TY),3,4ELSECIRCLE(TX,TY),3,
2
440 NEXTTY,TX:RETURN
470 FORWW=1TO2:PLAY"V15O4T255ABC
DV31EFG":NEXTWW:RETURN
480 GOSUB470:CIRCLE(X+4,Y+4),3,1
:FORW=1TOGN:IFGY(W)>30THENGC=2EL
SEGC=4
484 IFPPOINT(GX(W),GY(W))=GC THE
NGOSUB470:RETURNELSENEXTW
488 COLOR(RND(8)),5:LINE(X,Y)-(X
X,YY),PSET,BF
490 PLAY"V2L30T250O5":FORW=1TO14
:PLAY"V+AA+V+":NEXT:PLAY"T10P2O3
V31L10AV16AV8AV3AV1L20A":GOTO488
500 CX=RND(255):CY=RND(191)
510 FORW=2TO10STEP2
520 CIRCLE(CX,CY),W,5:PLAY"T50O5
C":NEXTW
530 PAINT(CX,CY),7,8
540 IFPPOINT(X,Y)=2THEN570
550 PLAY"T250O1ABG"
560 IFPEEK(65280)=126ORPEEK(6528
0)=254ORINKEY$=" "THEN70ELSE550
570 PLAY"T3P2":PAINT(CX,CY),5,8:
PLAY"T10C":GOTO130
580 PLAY"T10O3AP10O5V2T50":FORW=
1TO14:PLAY"V+AA+V+":NEXT:EX=EX+1
:IFEX>3THENPLAY"V31T50O2CP1CP1C"
:GOTO130ELSERETURN
590 NN=0:IFPEEK(65280)=126ORPEEK
(65280)=254THENGOSUB580:COLOR8,8
:CN=1:RETURN
600 IFJOYSTK(0)=63THENNN=2
610 IFJOYSTK(1)=0THENNN=1
620 IFJOYSTK(1)=63THENNN=3
630 IFJOYSTK(0)=0THENNN=4
640 IFNN=0THEN590ELSERETURN
```

STEP UP
68000
6809
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IF YOU HAVE ...
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- connect cables for terminal, drives, and power supply

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SASI bus for connection to hard disk drives
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up to 32K bytes of ROM

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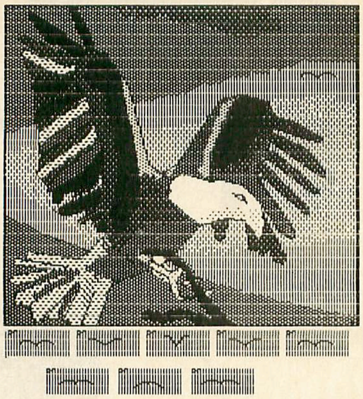
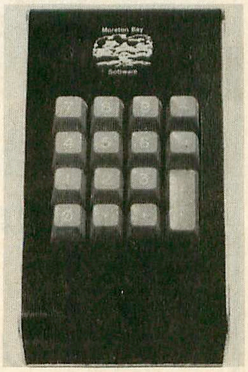
MORETON BAY SOFTWARE



THE MOTION PICTURE

A complete animation development system for your CoCo An object oriented graphic screen developer. Using thi tool you can quickly and simply animate your pictures Take standard graphic screens that you develop an incorporate them into MOTION PICTURES. Animate u to eight frames, yielding smooth animation. Generat screens from objects and build screens from stored objec files. Included are routines to display animation fro BASIC. We believe you'll like this program, so we mak this offer: We will send you a demonstration disk for $4.0 which you can apply as a credit if you buy the program Requires 64K. Disk, $39.95.

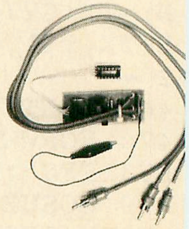
MORE KEYS



At last a quality numeric keypad for your Color Computer. This 15 key numeric pad plugs inside your computer and gives you the convenience of rapid numeric data entry. Dimensions: length 6½" (165mm), width 4" (101 mm), height 3" (76 mm). Baked black enamel finish. Specify computer model. MORE KEYS complete with cable and connector.

$69.95

DOUBLE DRIVER



The BEST monitor driver available. Color composite, monochrome and audio output. For original CoCo D, E and F boards. $24.95.

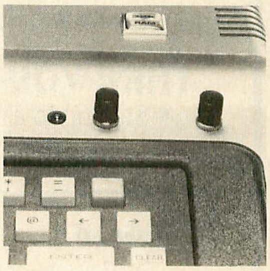
MONO II

Mono II for Color Computer 2. An excellent monochrome monitor driver that has audio output also. Specify model needed.

$24.95.

RESET-POWER-SWITCHES

A REAL IMPROVEMENT

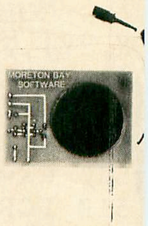


Move the power switch and reset switch where they belong. An LED power on light too! High quality parts, D and E boards totally solderless. The F board and some models of the CoCo II require soldering.

Reset 1 Coco 1 $24.95
Reset 2 CoCo 2 $27.95

Either kit add $2.00 shipping and handling.

MINI MOUTH

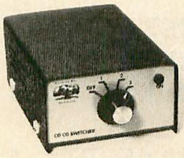


Add sound to your mute monitor. Hear the bells and whistles of your software again. No batteries. Solderless installation.

All Color Computer Models
$24.95

THE COCO-SWITCHER

A QUALITY PIECE OF HARDWARE

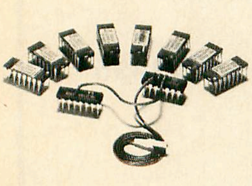


The CoCo Switcher allows you to hook three peripherals to your RS-232 jack. C nect your modem, printer and any ot RS-232 compatible peripheral to the Co Switcher. An LED on the CoCo Switc shows if your computer is on or off at a glan The LED flickers when transmitting or rece ing data.

Dimensions: 2½" (64mm) x 4" (102 m x 5 7/8 (150 mm)

$39.95 plus $2.00 shipping and handli

64K UPGRADES



Instantly access 64K via M/L totally solderless kit to upgrade E Boards. Kit includes eight 4164 prime chips and chips U29 and U11 already soldered. SPECIAL: E Board Kit $39.95, F Board and Color Computer 2 $26.95.

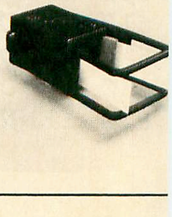
Guaranteed Pretested

FILE CABINET

Data base, alphabetizes, sorts numeric entries, searches for key words or numbers, computes totals & averages by categories, saves records, changes or deletes them. Up to 20 entries for each record, up to 256 characters for each entry. Mailing list included. Output to screen, printer or tape. Print all or selected records, +, −, ×, ÷ Numeric entries.

16K EXB Cassette $29.95

PIEZO FAN



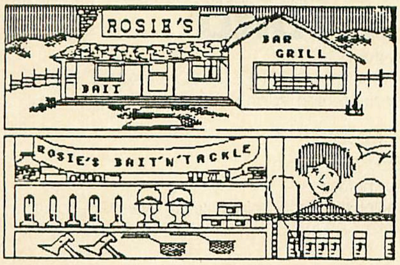
Two counter-oscillating mylar blades are driven at resonance by two piezo ceramic elements. No wearing parts. No RFI and no EMI. Consumes 0.11 watt at 120 VAC. Moves 5 cubic feet of air per minute. Mounts inside your CoCo. 3.2 cm. x 5.1 cm. x 8.4 cm. **Please** specify computer model number.

$29.95

Having trouble with your CoCo? We have the chips you nee Call us. (805) 962-3127

MORETON BAY SOFTWARE

THE VERY BEST IN GRAPHICS


ROSIE'S
BAR
GRILL
BAIT
ROSIE'S BAIT'N'TACKLE

SAM DIAMOND, P.I.

ıe first of our new Sam Diamond graphic adven-
res. More than 40 detailed high resolution graphic
enes. A killer is loose in the city. Can you bring him
justice before he gets you? Excellent graphics and
tough mystery to solve.

32K Disk Only $29.95
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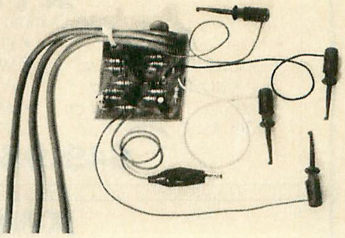
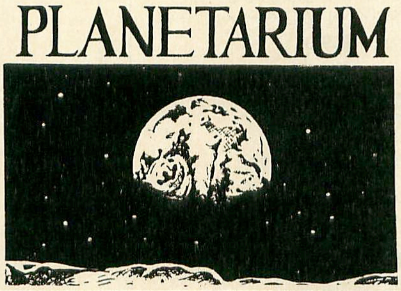
DOUBLE DRIVER II

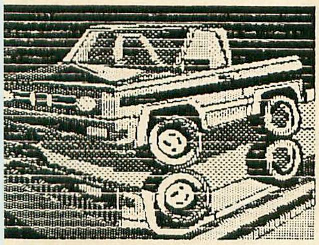
Finally a monitor driver for the Color Computer II that lets you use a monochrome and a color monitor simultaneously. We're proud of this new driver. The six transistor circuit provides optimal signal mixing and signal gain. Excellent monochrome output and better quality resolution in the color output than any driver we have seen. Audio output also. Fits all models of the Color Computer II. $29.95.




PLANETARIUM

PLANETARIUM

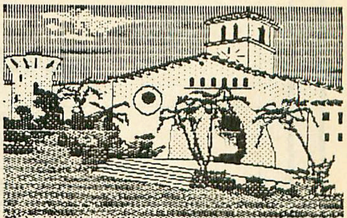
A five program celestial package. A star gazer's aid. A program to familiarize you with the appearance of the major constellations. 21 first magnitude stars. Moon phases. Day or night sky. Any latitude. 33 constellations. Charts planet locations from A.D. 0 to the year 10,000. Requires 16K Extended Basic. $19.95



GET THE MOST FROM YOUR GRAPHIC PROGRAMS

How to integrate Graphicom and CoCoMax. Two tutorial disks full of examples and suggestions. See how to create graphics step by step. Learn how to display and even animate your graphics from Basic.

1 Disk $14.95
2 Disks $24.95



This is the final result after editing the file using Graphicom.

GRAPHICOM

ıy Graphicom from us and get one of our unique picture
ks free! Get our improved Picture Disk One also. The first
the new generation of graphic utilities. An excellent utility.
quires: 64K EXB, Disk Drive and Joy Sticks. Three disks
d the best bound documentation for only $29.95.

ılligraphy STAMP DISK: Useful letters and designs for
ıking your own signs and menu screens.

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ıw pictures and learn more about Graphicom.

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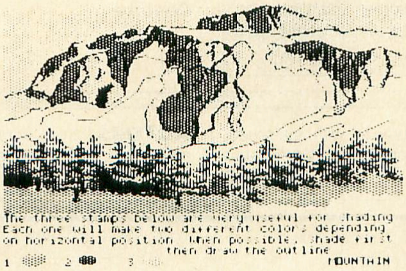
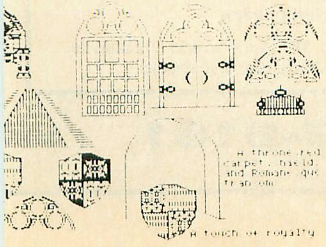
ıphicom tutorial as well as a useful library of images you
ı use.

ABCDEFGHI
KLMNOPQR
TUVWXYZ
23456789
ıbcdefghijhl


The three stamps below are very useful for shading
Each one will make two different colors depending
on horizontal position. When possible, shade first
then draw the outline
1
2
3
MOUNTAIN

ılligraphy Disk II: 23
v letter stamp sets.

⌂
Adventure Disk II


A touch of royalty

◊ Adventure Disk 1

1 Picture Disk $15.95
2 Picture Disks $24.95
3 Picture Disks $29.95
4 Picture Disks $34.95

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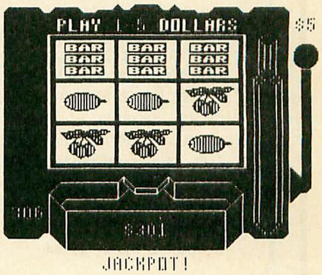
Own the hottest slots on the block! Run your own casino with 6 different slot machines. Control the payout Bet $1.00 to $5.00. Choose double and triple jackpots. Gamble to your heart's content. Play casino odds, moderate odds or get rich quick. Play a game of skill - SLAMSHOT! - try to stop the reels yourself.


PLAY 1 - 5 DOLLARS
$5
BAR
BAR
BAR
JACKPOT!

32K EXB, Joystick optional
$24.95 Specify Disk or Tape

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OS9 + X = POWER

XTERM

OS-9 Communications program.

- Menu oriented
- Upload/download. Ascii or XMODEM protocol
- Execute OS-9 commands from within XTERM
- Definable macro keys
- Works with standard serial port, RS232 PAK, or PBJ 2SP Pack. Includes all drivers.
- Works with standard screen. XSCREEN, or WORDPAK 80 column board

$49.95 with source **$89.95**

XMENU

Creates a menu driven environment for OS-9.

- Create your own menus
- Works with standard screen, XSCREEN, WORDPAK, O-PAK

$29.95 with source **$59.95**

XSCREEN

OS-9 hi-res screen

- 51/64/85 chars per line
- Easy menu operation

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XDIR & XCAL

Hierarchial directory

- Full sorting
- Complete pattern matching

OS-9 calculator

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- +, —, *, /, AND, OR, XOR, NOT

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XDIS

OS-9 disassembler

$34.95

XWORD

OS-9 word processing system.

- Works with standard text screen, XSCREEN, WORDPAK, or O-PAK
- True character oriented full screen editing
- Full block commands
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Mail merge capabilities for XWORD

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XSPELL

OS-9 spelling checker, with 20000 and 40000 word dictionaries

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AND FOR RS DOS . . .

SMALL BUSINESS ACCOUNTING This sales-based accounting package is designed for the non-accounting oriented businessman. It also contains the flexibility for the accounting oriented user to set up a double entry journal with an almost unlimited chart of accounts. Includes Sales Entry, transaction driven Accounts Receivable and Accounts Payable, Journal Entry, Payroll Disbursement, and Record Maintenance programs. System outputs include Balance Sheet, Income Statement, Customer and Vendor status Reports, Accounts Receivable and Payable Aging Reports, Check Register, Sales Reports, Account Status Lists, and a Journal Posting List. **$79.95**

ACCOUNTS RECEIVABLE Includes detailed audit trails and history reports for each customer, prepares invoices and monthly statements, mailing labels, aging lists, and an alphabetized customer listing. The user can define net terms for commercial accounts or finance charges for revolving accounts. This package functions as a standalone A/R system or integrates with the Small Business Accounting package. **$59.95**

These programs are user friendly and menu driven. Sample transactions are included. Each package features a hi-res screen. Each requires a printer, a minimum of 32k and at least 1 disk drive.

PAYROLL Designed for maintaining personnel and payroll data for up to 200 hourly and salaried employees with 8 deductions each. Calculates payroll and tax amounts, prints checks and maintains year-to-date totals which can be automatically transferred to the SBA package. Computes each pay period's totals for straight time, overtime and bonus pay and determines taxes to be withheld. Additional outputs include mailing list, listing of employees, year-to-date federal and/or state tax listing, and a listing of current misc. deductions. Suited for use in all states except Oklahoma and Delaware. **$59.95**

DMS Database Management System. Search, sort, calculated fields, disk and tape interfaces. **$24.95**

CBK Complete check register with statement balancing. Includes full amortization program and wage analysis program. **$24.95**

AUTO85 Hi-res screen. 51/64/85 characters per line, inverse characters, automatic line numbering. **$19.95**

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Dealer Inquiries Invited
OS-9 is a trademark of Microware

Ordering Information

Add $3.00 shipping & handling, MN residents add 6% sales tax.
Visa, Mastercard, COD (add $2.50), personal checks.

MasterCard VISA

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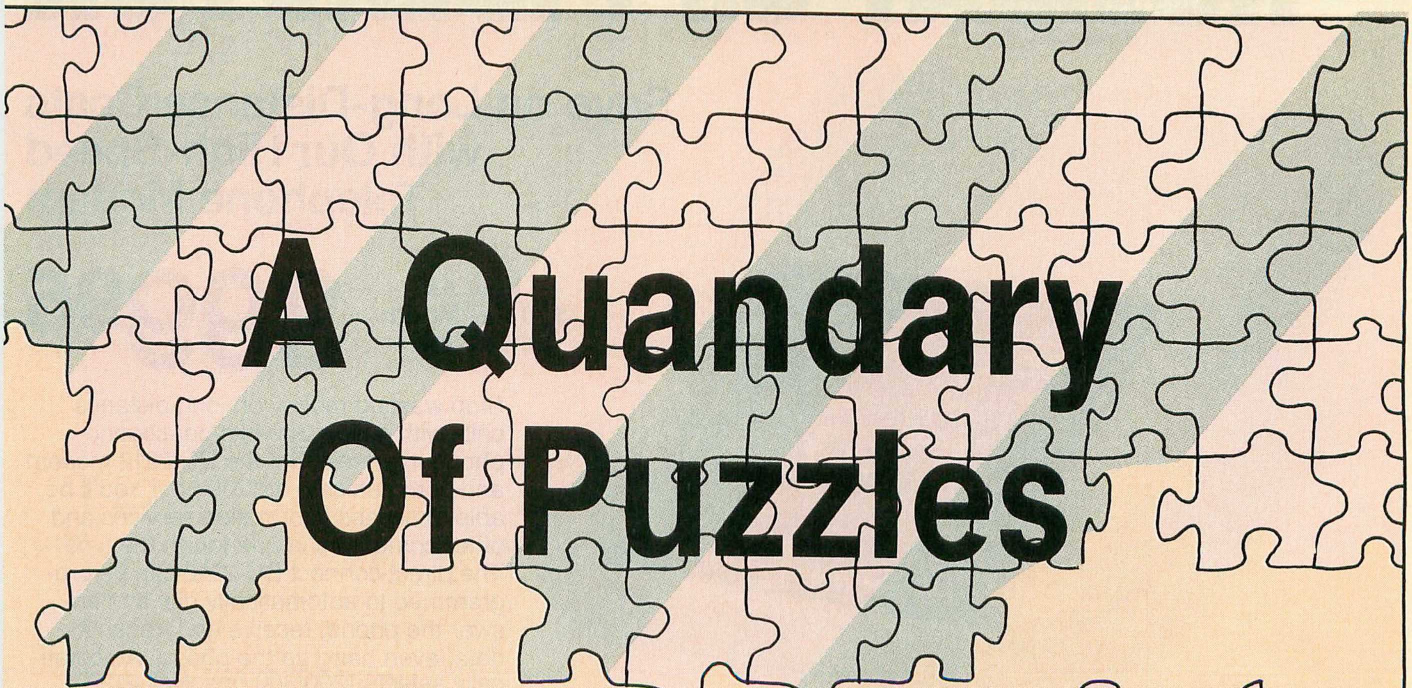
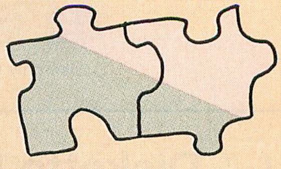
A Quandary Of Puzzles





By Bill Franks

Are you tired of the same old games? Ready for something new? Do you want something challenging yet easy enough for young children? If you answered "Yes!" to the above, then *CoCo Puzzler* is for you. It is a short program that makes puzzles. You can have easy puzzles for kids or puzzles that will give an expert a headache.

After running the program, you are first given the option of selecting one of six types of random puzzles made by *CoCo Puzzler*, or having it scramble a picture of your own. Next you are asked how many figures you want drawn. Finally, you're asked how many pieces you want (24 or 96).

After *CoCo Puzzler* has finished scrambling, a square appears in the top left corner. Move this square over the pieces using the arrow keys. When this square is on a piece you want to move, press the space bar; you will hear a beep. Move the square to the piece you want to trade with and press the space bar again. This time the two pieces trade places. Keep going like this until you have the puzzle back to its original form.

You can look at what the puzzle should look like at any time by pressing the 'S' key. Pressing any key restores the screen to the scrambled puzzle. When you're finished or give up, press the 'R' key to reset and go back to the menu.

If you want a real challenge, try a puzzle of 200 lines with 96 pieces. If you can solve this without going crazy you are truly a master.

Making Your Own Puzzle

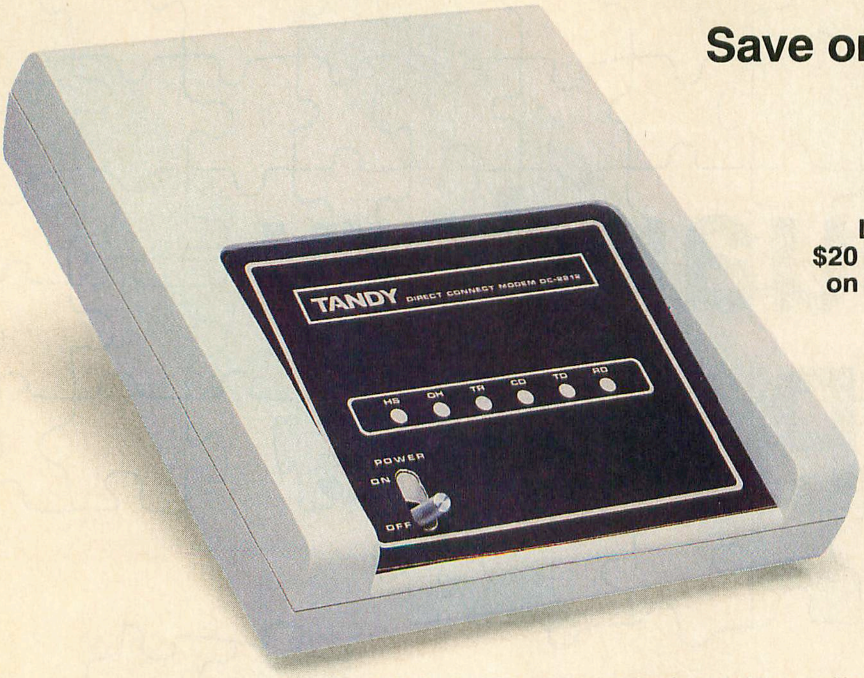
You can type in a program to draw any picture by starting at Line 400. *CoCo Puzzler* takes the picture and scrambles it. The first line of the program must be `400 PMODE 1,1:PCLS`. The last line must end in `SCREEN 1,0:GOTO90`. The only other limitation is that the picture must be within the limits of 250 horizontal and 160 vertical or it won't all be scrambled. Other than these three rules, anything CoCo can take will work.

To help you better understand, here's a line-by-line description.

Lines	Description
30-90	Gets information on what kind of puzzle you want
95-140	Draw puzzle (each subroutine draws a different shape)
145-175	Scramble puzzle
180-225	Main loop
230-270	Subroutines used by main loop
400-END	Reserved for your program

(You may contact the author with any questions about this program at 4939 Tunlaw St., Alexandria, VA 22312, phone 703-941-6495. Please include an SASE when writing.) ☐

HOLIDAY GIFT IDEAS FOR


TANDY
DIRECT CONNECT MODEM DC-2212
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OH
TR
CD
TD
RD
POWER
ON
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Save on Long-Distance Costs with Our High-Speed Telephone Modem

Low As
$20 Per Month
on CitiLine★

399^{95}

Stop wasting money on long-distance calls with a slow 300-bits-per-second phone interface. Get the DC-2212 modem and communicate at 1200 bps! You'll be able to access information services and other computers in one-fourth the time. The direct-connect DC-2212 can be programmed to automatically dial and answer the phone, receive and transmit data, even hang up the phone. Automatically selects 1200/300 bps. Bell 212A-compatible. FCC registered. #26-1176.

Use only with Bell-compatible equipment. Not for multi-line use without optional-extra controller.

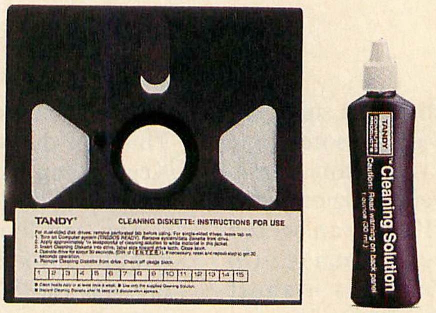
5 1/4″ Diskette Storage Box

Disks not included

14^{95}

Protect up to 50 floppy diskettes from loss, dust and abuse. Five adjustable dividers keep disks organized and easy to find. Storage box is made of sturdy, high-impact styrene. Stackable for convenient storage. #26-1362.

5 1/4″ Disk Drive Cleaning Kit


TANDY
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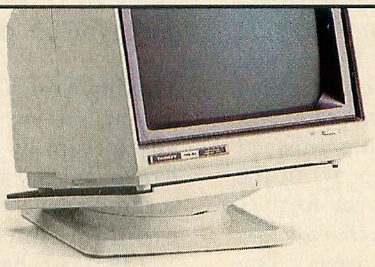

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```
85 .......164
135 ......180
215 ......146
END ......93
```

The listing: PUZZLER

```
0 'COCO PUZZLER
5 'BY BILL FRANKS
10 '4939 TUNLAW ST.
15 'ALEXANDRIA,VA. 22312
25 DIMA(20),B(20)
30 CLS
35 PRINT"ENTER CHOICE OF PUZZLE"
40 PRINT"(1) LINES"
45 PRINT"(2) CIRCLES"
50 PRINT"(3) FILLED CIRCLES"
55 PRINT"(4) BOXES"
60 PRINT"(5) FILLED BOXES"
65 PRINT"(6) MIXTURE OF ALL FIVE
":PRINT"(7) OWN PICTURE STARTING
 AT LINE400"
70 INPUTK:L=K:IFK<1ORK>7THEN70
75 INPUT"HOW MANY FIGURES DO YOU
 WANT    DRAWN(2-200)";M:IFM>200
ORM<2THEN75
80 PRINT"HOW MANY PIECES?":PRINT
"(1) 96":PRINT"(2) 24":INPUTPC:I
FPC=1THENPC=96ELSEIFPC=2THENPC=2
4ELSE80
85 IFK=7THEN400ELSEPMODE1,1:PCLS
:SCREEN1,0
90 DRAW"C3BM20,170R20D10L20U10D2
0BM45,170D20R20U20BM70,170R20G20
R20BM95,170R20G20R20BM120,170D20
R20BM145,170R20L20D10R20L20D10R2
0BM170,170R20D10L20U10D20U10M+20
,+10":FORI=1TOM
95 A=RND(240):B=RND(160):C=RND(2
40):D=RND(160):ONK GOSUB110,115,
125,130,135,140
100 NEXT
105 GOTO145
110 COLORRND(3)+1,1:LINE(A,B)-(C
,D),PSET:RETURN
115 IFA<20ORA>220ORB<20ORB>140TH
ENA=RND(240):B=RND(160):GOTO115E
LSEC=RND(3)+1:CIRCLE(A,B),RND(20
),C:IFL=3THEN120ELSERETURN
120 PAINT(A,B),C,C:RETURN
125 GOTO115
130 COLORRND(3)+1,1:LINE(A,B)-(C
,D),PSET,B:RETURN
135 COLORRND(3)+1,1:LINE(A,B)-(C
,D),PSET,BF:RETURN
```

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```
140 ONRND(5)GOTO110,115,125,130,
135
145 PCOPY1TO3:PCOPY2TO4:IFPC=24T
HENST=40ELSEST=20
150 SR=ST-1:FORJ=0TO120+(40-ST)S
TEPST:FORI=0TO200+(40-ST)STEPST
155 IFST=20THEN160ELSEG=(RND(6)-
1)*40:H=(RND(4)-1)*40:GOTO165
160 G=(RND(12)-1)*20:H=(RND(8)-1
)*20
165 GET(I,J)-(I+SR,J+SR),A,G:GET
(G,H)-(G+SR,H+SR),B,G:PUT(I,J)-(
I+SR,J+SR),B,PSET:PUT(G,H)-(G+SR
,H+SR),A,PSET
170 NEXT:NEXT
175 SH=0:SV=0:E=0:F=0:GOSUB265:C
OLOR2,1:GOSUB260
180 I$=INKEY$
185 IFI$=CHR$(32)THENSOUND100,1:
GOTO230
190 IFI$=CHR$(94)THENSV=-ST
195 IFI$=CHR$(10)THENSV=ST
200 IFI$=CHR$(9)THENSH=ST
205 IFI$=CHR$(8)THENSH=-ST
210 IFI$="R"THEN30
215 IFI$="S"THEN240
220 IFSV<>0ORSH<>0THENGOSUB270:E
=E+SH:F=F+SV:GOSUB250:GOSUB265:C
OLOR2,1:GOSUB260
225 SH=0:SV=0:GOTO180
230 SW=SW+1:IFSW=1THENS1=E:S2=F:
GOSUB270:GET(E,F)-(E+SR,F+SR),B,
G:COLOR2,1:GOSUB260
235 IFSW=1THEN180ELSEPUT(E,F)-(E
+SR,F+SR),B,PSET:PUT(S1,S2)-(S1+
SR,S2+SR),A,PSET:SW=0:GOSUB265:C
OLOR2,1:GOSUB260:GOTO180
240 PMODE1,3:SCREEN1,0
245 IFINKEY$=""THEN245ELSEPMODE1
,1:SCREEN1,0:GOTO180
250 IFF<0ORF>140THENF=F-SV
255 IFE<0ORE>220THENE=E-SH:RETUR
NELSERETURN
260 LINE(E,F)-(E+SR,F+SR),PSET,B
:RETURN
265 GET(E,F)-(E+SR,F+SR),A,G:RET
URN
270 PUT(E,F)-(E+SR,F+SR),A,PSET:
RETURN
400 CLS:PRINT"NO PICTURE ENTERED
 AT 400":GOTO35
401 ' BEGIN YOUR PROGRAM WITH "P
MODE1,1:PCLS"
402 ' AFTER ENTERING YOUR PICTUR
E THEN ADD "SCREEN1,0:GOTO90" AS
 LAST LINE
```

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Making your own multiple-choice quiz . . .

Creative Programming For The Beginner

By Joseph Kola
Rainbow Contributing Edito

The ubiquitous multiple-choice quiz is uniquely adaptable as an education adjunct of CoCo's remarkable versatility. It handles this kind of test admirably. If CoCo can handle it, can the beginner program it? Yes, indeed! The only stipulation is that the enterprising newcomer must know the correct answers to the questions he or she poses. With the core program we are going to zero in on, the beginner can devise, present and automatically grade a 10-question exam. With appropriate changes in the scoring routine, the test can be expanded to contain as many questions as CoCo allows.

Perhaps the word "core" is a misnomer. It suggests that a program will be built around a foundation. True enough, but visualize the core as two slices of bread with your program — one time, beef, another time tuna fish and still another time, bologna, tucked in between the two slices.

For the purpose of this program, a test is created using nonsense questions and answers. They are included merely as a vehicle to explain how the program is put together. Substitute questions in a subject that interests you as soon as you understand the technique demonstrated. Each question formulated should be limited to two text lines consisting of about 60 characters/spaces. Each of four answer choices should be limited to one text line, about 25 characters/spaces. The idea is to bundle both the question and answer options into one program line in a repetitious format. String space limitation is the guilty party.

(Florida-based Joseph Kolar is a veteran writer and programmer and specializes in introducing beginners to the powers of CoCo.)

Copy lines 0 to 6 and 200 to 560 from Listing 1. This is the core program. You should `CSAVE` a few copies. Let's look at the "core."

Whenever the number of items are counted, such as total number of questions asked, correct and incorrect responses given, etc., the variables representing these factors must be set to zero near the beginning of the program. Each cycle through a program will start fresh, to wit, zero (Line 5). Somewhere near the end of the program, after scoring, a line must direct the program to return to Line 5 so that any accumulated values are reset to zeros (Line 511). This is not much different from resetting the counter of a cassette recorder to "000" after rewinding the tap to the beginning.

Insert questions starting at progra Line 10. Line 11 is an answer-pointin `GOSUB` line. Each question line an answer-pointing line is incremented b five. Thus, the second question is o Line 15 and the answer-pointing line 16.

Unmask Line 6 by deleting the `RE` marker. Set Line 6 to `GOTOX`, where ' is the current program line you ar creating. Now for a little "hands-on. Each question/answer line begins wit `CLS0:PRINT@X,"` followed by tw spaces. X=128 is set on Line 5. Th question is keyed in. Use the questio in Line 10, Listing 1. Omit the closin quotation mark and run.

Check your work. Do you recall ho we formatted text last month? Fo example, the first question had a wor that was draped over two text lines. Tw spaces had to be inserted after th hyphen (-) to move CO to the next lin Now press `BREAK`. `LIST10` and note th opening quotation mark ("). Draw a imaginary vertical line at the quotatio mark. The first text character to th right of it is at the left end of the tex screen. It happens to be a space. Belo it we find 'C', which is also at the le margin. Being aware of the imaginary ine, you should have no trouble locatng the position of each succeeding left-margin character.

Back to work! You may place the correct answer in the location of your choice, from 1 to 4. If you want the answer to be number 1, key in the answer after "1." and space, then after numbers 2 to 4, key in the incorrect choices. It's your quiz, so place the correct answer where you choose. Devise whatever wrong answers tickle your fancy and fill in the other choices. EDIT10 and presss 'X' to go to the end of the entry. We want to skip a line. Space repeatedly until you go under the C' twice; that is at the left margin. You hould have, using the imaginary, verical line as a guide: a space, 'C', another pace, then the cursor. Key in the first choice, DOINA TANASA, and ENTER. Remember to omit the closing quotaion mark and `RUN`.

A blank line should be between the question and the first choice. The answer options are indented two spaces. Then comes the number, a period, a pace and the name. If it looks right, `EDIT10` and press 'X' to go to the end of the entry. Advance the cursor with he space bar until it is under the '1' and key in the second answer option. If you eel confident that you have keyed it in correctly, advance the cursor until it is under the '2' and type in the third choice, then the fourth, and so on. At he end of your last choice, key in the losing quotation mark, press ENTER and `RUN`.

You may prefer to enter each choice one at a time and check out your work. This second technique is slower, but usually any error will be near the end of the program line. These errors are asier to correct as opposed to those mbedded in the middle of a long program line. There is something to be aid for being slow and methodical; anybody can hurry up and make a mistake.

Observe your work and note the left margin. Press BREAK and `LIST10`. Can ou spot the left margin by drawing the maginary vertical line? Now run the program, note the prompt, '?', and press BREAK. In order to inform CoCo which s the correct answer, we have to indiate the proper subroutine. If the corect answer is choice '1', '2', '3' or '4', we must `GOSUB 200, 210, 220` or `230`, espectively.

Key in `11 GOSUB200` and ENTER. Remember, you have the luxury of switching your answer choices to any order you please. If you typed the fourth choice as the correct answer, Line 11 would read `GOSUB230` to reflect this situation.

Since it so happens that the first choice is the correct answer, `LIST200-201`. CoCo knows that the first choice is the correct answer from Line 201. In Line 200, CoCo asks the quiz-taker for his answer. Line 201 checks Line 200 to see which number 'A' represents. If 'A' is equal to '1', CoCo will proceed to the first listed `GOTO` on Line 201. If A=2 to 4, CoCo will proceed to Line 251, (wrong choices). 'A' is equal to '1' so CoCo went to Line 250, which processes correct answers.

In effect, when you told CoCo in Line 11 to `GOSUB200`, you told it that the first choice contained the correct answer. What did CoCo do next? Type in `LIST250`. Each correct answer, 'E', is augmented by +1. Each question asked, 'N', is likewise augmented. A loud "bleep" announces the right answer. If 'N' does not reach a value of 10 (questions), a pause is registered at Line 300 and returns to present the next question. If N=10 (questions), CoCo advances to Line 400 with a cleared blue screen. Now `LIST400-404`. Using a bunch of "IF E's =" lines, scores are printed and comments offered.

Type in `LIST250-251`. If the wrong answer is chosen (answer options 2, 3 or 4) a shorter bleep will sound! The wrong answer, 'F', will be incremented by +1. Otherwise, both lines are the same: keeping tallies of the number of questions asked, correct and incorrect responses and going on to the next query unless 10 questions are answered.

After the final scoring, on the same panel, a long pause allows you to digest the score and you are given a choice of running through the quiz again or quitting.

If you run your program at this stage, you would get an RG Error message. CoCo has no place to go because only one question is finished. You could key in `199 GOTO 199` to hold the displayed question or key in `199 GOTO 6` to repeat the question you are currently composing.

`EDIT6` and press 'X' to go to the end of the line, then press the left-arrow key, '5' and ENTER. All the question lines begin the same. Type `CLS0:PRINT@X,"` and space twice. If you copy the question used in Line 15, Listing 1, and if you study this text just keyed in, you will see that the imaginary vertical line indicates that 'P' in PEAK is at the left margin. Run the program to double-check.

Recall that we omitted the closing quotation mark until we finalized the program line by typing in the fourth choice. This was for the sake of convenience. It is unwieldy to have to take off the closing quote in order to add more text to a line, especially when it is checked for accuracy two or three times during formulation. For that matter, you could leave out the closing quote entirely. It is better to avoid bad habits because sometimes they may lead to time-consuming errors.

> ***"With the core program we are going to zero in on, the beginner can devise, present and automatically grade a 10-question exam."***

After you check out the question part of the line, follow the same system you used to create the four answer options and complete the line. You may have to delete or insert spaces so the four lines align vertically.

The correct answer is number 2, thus Line 16 directs CoCo to `GOSUB210`. Now `LIST210-211` and note when A = 1, 3 or 4, CoCo knows the response is incorrect and proceeds to Line 251 to tabulate the wrong answer. Only if A=2 will CoCo continue on to Line 250 to tabulate the correct response.

Just to prove a point, `EDIT15` and press 'X' to go to the end. Space over until you are unable to move forward. You have reached the end of the string space. Now you know why each question is engineered to be less than 64 characters/spaces long. This allows us to skip a row and use the next four lines to key in our possible answers, which should be no more than about 28 characters/spaces long. We have a nice, tight format that allows us to condense the entire question/answers on one program line without a lot of PRINT@s.

Make up your own test questions and answers to get the feel of using this repetitious format, or use those from Listing 1. When you have keyed in 10 questions/answers and figured that your program is debugged, either type in DEL6 or mask it with a REM marker. Make sure it is running just the way you want it to run. Take the REM marker out of Line 1 and run again (if you have a disk system, the REM must be left in). Doesn't that look professional? Now press BREAK and type LIST. Isn't that a nice slow scroll? This POKE has its limitations. If you want to get back to normal scrolling to add a title or make further modifications, EDIT1 to read POKE 359,126.

Suppose you don't want somebody looking over your listing? Insert 2 POKE 383,158, RUN it, then press BREAK and LIST. Sorry about that! You just lost the listing, but you can edit any line provided you know the line number. To get back to normal, EDIT2 to read POKE 383,0.

Fooling around, I noted that we could barely, just barely, add a fifth answer option to use up the rest of string space in each question line. Knock off the final quotation mark and space over so the cursor is under '4' and add 5. followed by a space, then NOA" (for "none of the above").

Here is your puzzle! Add the fifth option to all 10 questions. Adjust or insert any program lines as required to reflect this addition. Pick out and alte some of the questions so the correc answer is NOA and check them out. Th bleep will sound if you succeeded. If yo revise the program correctly, not onl will you have solved a puzzle, but yo will have enhanced the program b having five possible answers and sti remain within the same constraints.

Whether you have four or five answe options, you will be able to make u quizzes in any subject: Bible quizzes geometry, language arts (both foreig and domestic), history, trivia, geo graphy — you name it! If you ca develop one test you can create a thou sand using this format. We proved th point again that beginners can do crea tive programming and have fun doin it.

21 216
41 24
56 64
END 235

Listing 1: MC QUIZ

```
0 '<HOGWASH> TAKE REM MARKER
FROM LINE 1 WHEN FINISHED.
1 'POKE359,60
3 '(C) 1985, J. KOLAR
5 E=0:F=0:N=0:X=128
6 'GOTO10
10 CLS0:PRINT@X,"  WHO WORE A RE
D HAT AND BUFF-  COLORED BOOTS?

                 1. DOINA TANA
SA               2. SVENGALI
                 3. 'SWEDE' JE
NSEN             4. KARL MARX"
11 GOSUB200
15 CLS0:PRINT@X,"  THE FIRST ONE
 TO CLIMB PIKE'S PEAK WAS---?

                 1. ARNOLD WON
G                2. JOHN ROGER
 PEAK            3. MR. PEPPER
                 4. DR. PEPPER
"
16 GOSUB210
20 CLS0:PRINT@X,"  WHO STARRED I
N THE T-V MOVIE, 'BULAWAYO THE G
REAT'
                 1. KUNTA KINT
AY               2. GEN. FRANK
LIN HIGGINS      3. DOCHITA 'K
ITSA' DOBRE      4. ANA-MARIA
SPAGHETTI"
21 GOSUB220
25 CLS0:PRINT@X,"  WHAT IS THE N
AME OF THE LONG- EST RIVER IN JA
PAN?
                 1. BINGO
                 2. KUROSAWA
                 3. NISHI MIYA
SAKI             4. BUMBWANA"
26 GOSUB220
30 CLS0:PRINT@X,"  THE BIG TRACK
 STAR IS?
                 1. CONGO JIM
                 2. ANTHONY ED
EN               3. ANTHONY QU
INN              4. ANTHONY PE
RKINS"
31 GOSUB230
35 CLS0:PRINT@X,"  THE CHIEF OF
THE POLITBURO IN BULGARIA IS ---
?
                 1. GORMULKOV
                 2. SAMBYATSKI
                 3. SVEINSTEIN
                 4. BULDINKOV"
36 GOSUB 200
40 CLS0:PRINT@X,"  THE LAST KING
 OF UPPER SLOB-  OVIA WAS--?
                 1. HENRY V
                 2. KARL JOSEF
                 3. THEODORUS
II               4. MOISHE PIP
PIN"
41 GOSUB230
45 CLS0:PRINT@X,"  THE LAST MAN
TO DIE IN THE    BOER WAR WAS?

                 1. PVT. ARTHU
R K. MONET       2. 'BUFFALO'
BULL             3. PVT. POR Q
. PINE           4. PVT. ALEXA
```

```
NDER SCHERBITSKY"
46 GOSUB220
50 CLS0:PRINT@X,"   THE LAST WOMA
N TO DIE IN THE     BOER WAR WAS-
---PRINT
                    1. PVT. BETTY
 ANN WHITE          2. DIANA TANA
SA-MAY              3. HILDA BOTH
A                   4. KRUGER RAN
D"
51 GOSUB200
55 CLS0:PRINT@X,"   THE LAST CHIN
ESE EMPEROR WAS
                    1. FU MANCHU
                    2. HENRY PU Y
EE                  3. HA CHU
                    4. DENG PING
PONG"
56 GOSUB210
200 INPUT"          ";A
201 ON A GOTO 250,251,251,251
210 INPUT"          ";A
211 ON A GOTO251,250,251,251
220 INPUT"          ";A
221 ON A GOTO251,251,250,251
230 INPUT"          ";A
231 ON A GOTO251,251,251,250
250 E=E+1:N=N+1:SOUND100,4: IF N
=10 GOTO400ELSE GOTO300
251 F=F+1:N=N+1:SOUND50,1:IF N=1
0 GOTO400 ELSE GOTO300
300 FOR Z=1 TO 1000:NEXT:RETURN
400 CLS3:IF E=10 THEN PRINT@136,
"  PERFECT SCORE!";:GOTO500
401 IF E=9 THEN PRINT@134,"  JUS
T ONE BOO-BOO!";:GOTO500
402 IF E=7 OR E=8 THEN PRINT@129
,"  YOU PASSED WITH"E;"CORRECT.
";:GOTO500
403 IF E=6 THEN PRINT@128,"     Y
OU BARELY PASSED WITH";E;"     C
ORRECT.  ";:GOTO500
404 IF E=<5 THEN PRINT@128,"  SO
RRY, YOU MISSED TOO MANY.   BETT
ER STUDY UP SO YOU CAN PASS THE
NEXT TIME.":GOTO500
500 FOR Z=1 TO 1000:NEXT
510 PRINT@288,"  IF YOU WANT TO
RETAKE THIS      EXAM, PRESS <Y>.
 IF YOU WANT TOSTOP, PRESS ANY O
THER KEY";:INPUTA$
511 IF A$="Y" THEN GOTO5 ELSE GO
TO550
550 CLS(8):PRINT@234,"  THE END
 ";
560 GOTO560
```

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By Bernie Litton

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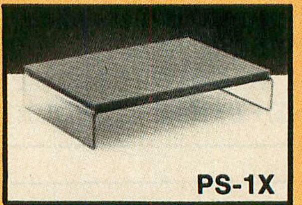

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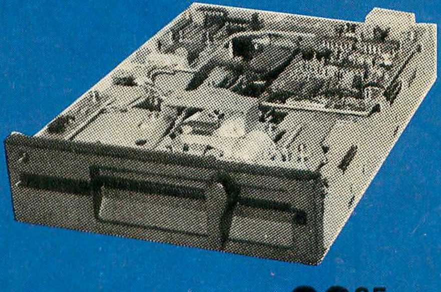

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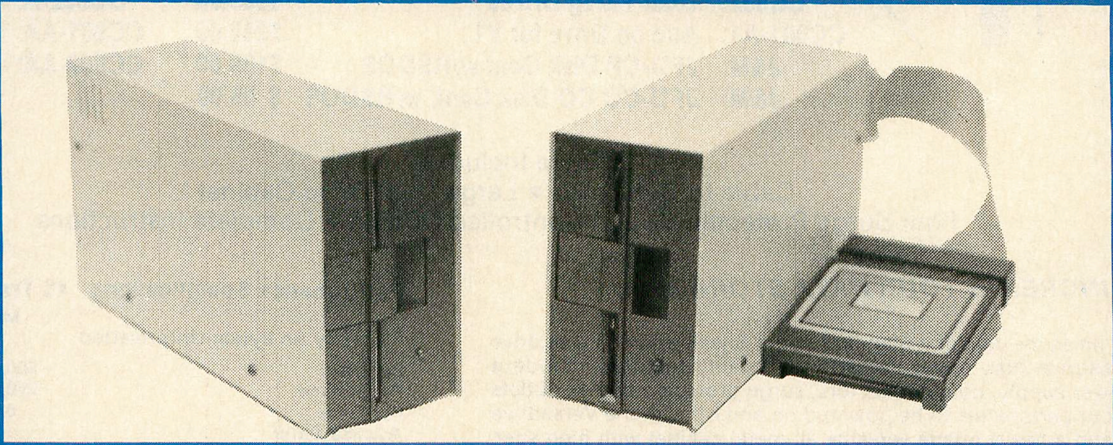

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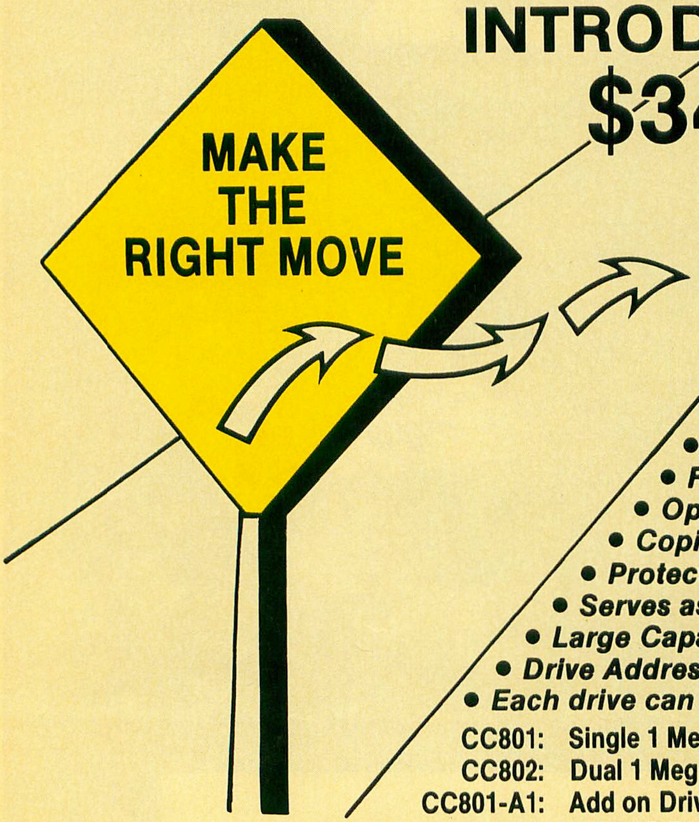

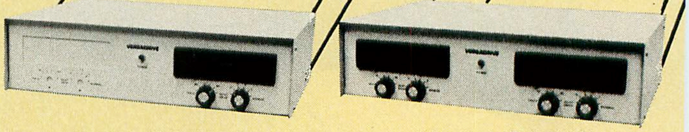

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- ***Each Drive Switchable 40 or 80 Tracks***
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- ***Copies 40 and 80 Track disks with One Drive***
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- ***Serves as a heavy guage monitor stand***
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- ***Drive Address switch selectable from front panel***
- ***Each drive can be 40 Track DS or 80 Track DS***

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*Price Includes:
Cable to Controller • Large Dual Drive Cabinet
Four Surge Protected Switch Controlled Outlets • Complete Instructions

INCREASE YOUR DATA STORAGE

Store over four times the data of a Standard Radio Shack® FD-501 disk drive with each Versadrive disk drive. Versadrive's quality features include a transformer power supply, gold connectors, surge protected duplex outlets that allow all your peripherals to be powered on and off with the Versadrive power switch, and a heavy guage versatile all-metal cabinet with high spec components to provide trouble free operation.

The Model CC801 (single disk drive) can load and format disks with either 35 or 40 tracks, and copy your 35 or 40 track disks to 80 track, saving valuable disk space.

Versadrive requires a controller and is compatible with the standard Radio Shack® and J&M disk controllers. We highly recommend the J&M controller. Our experience has shown their gold contacts to be a real plus for reliability. You may order J&M controllers from us at a discount.

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Versadrive will run on TRS 80, Models III & 4 as drives III and 4 in 40 track mode.

Performance Specifications	**40 Track** Mode	**80 Trac** Mod
Capacity (in bytes) Unformatted		
Per Disk	500,000	1,000,00
Per Surface	250,000	500,00
Per Track	6,250	6,25
Access Time		
Track to Track	6 msec	3 mse
Average	93 msec	94 mse
Settling Time	15 msec	15 mse

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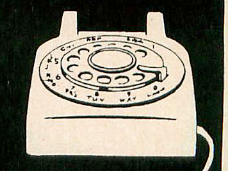
Listing 2: SUPRNOVA

```
0 'SUPRNOVA
10 '(C) 1984, J. KOLAR
30 PMODE3:PCLS:PMODE4
40 A=168:B=98:P=3.88
50 DIM B(2), D(2), F(2), H(2), J
(2)
61 CIRCLE(14,4),4,1
63 CIRCLE(34,4),3,1
65 CIRCLE(54,4),2,1
67 CIRCLE(74,4),1,1
71 GET(10,0)-(18,8),B,G
73 GET(30,0)-(38,8),D,G
75 GET(50,0)-(58,8),F,G
77 GET(70,0)-(78,8),H,G
79 GET(93,3)-(95,5),J,G
90 PCLS:SCREEN1,1
271 FOR Q=1TO 3
272 FOR R=80 TO -80 STEP-20
273 FOR Z=2000 TO 270 STEP+16:C=
LOG(Z):K=LOG(C)
275 X=INT(A+R*COS(C+P+.72)):Y=IN
T(B+R*SIN(C-K+.72))
276 V=RND(8):ON V GOTO 280,285,2
90,295,305,310,315,320
280 PUT(X-40,Y-10)-(X-32,Y-2),B,
PSET:SOUND50,1
285 PUT(X-40,Y-10)-(X-32,Y-2),D,
PSET
290 PUT(X-40,Y-10)-(X-32,Y-2),F,
PSET
295 PUT(X-40,Y-10)-(X-32,Y-2),H,
AND
300 X=INT(A+R*SIN(C+P+1.1)):Y=IN
T(B+R*COS(C-K+1.1))
303 V=RND(8): ON V GOTO 305,310,
315,320,280,285,290,295
305 PUT(X-40,Y-10)-(X-32,Y-2),B,
PSET:SOUND80,1
310 PUT(X-40,Y-10)-(X-32,Y-2),D,
PSET
315 PUT(X-40,Y-10)-(X-32,Y-2),F,
PSET
320 PUT(X-40,Y-10)-(X-32,Y-2),H,
AND:NEXTZ,R
325 PLAY"V25T3O2L8CCCDFFFGT2L16A
BCCABDDABO3CCO2ABCCT3L8V20FEDC
330 NEXTQ:PLAY"T3GFFFDCCC":FORZ=
1TO1000:NEXT:PCLS:GOTO271
```

The Accessible Computer Experts



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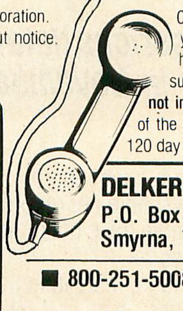

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This graphics program does more for you than just hi-res graphic editing. It will generate lettering in hi-res graphics that can be different sizes, skinny, bold, textured, drop shadowed, raise shadowed or tall. It will also interface with the Telewriter-64 word processor for printing hi-res displays with your letters.

As a graphics editor, it takes full advantage of all the extended BASIC hi-res graphic commands. Create boxes, circles, lines, copy displays and utilize GET and PUT features. Some added commands include mirror reflection, turn displays backwards or upside down. Squish displays, create dot patterns for shading or diagonal lines for creative backgrounds.

Special text files created with the Letter Head Utility allow you to access hi-res graphics from Telewriter-64, your own BASIC programs or PRO-COLOR-FORMS.

Interfaces with all popular dot matrix printers that have dot addressable graphic ability.

See reviews in:
July '84 Rainbow, Oct. '84 Hot CoCo

$29.95

SIMON

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SIMON will "watch" you run through any BASIC program and keep track of every keystroke you make. The keystrokes can be saved in a disk file so the next time you want to perform the same procedure, SIMON will do it for you.

A custom menu can be created so that the press of one key will have SIMON run your BASIC program(s) and select the appropriate command file to use. You can even have SIMON pause at any input so that you can enter information that won't be the same each time.

SIMON is perfect for any type of reporting, file maintenance or any other program that requires a sequence of prompts to be answered each time it's used. Included free with PRO-COLOR-FILE.

Requirements: 64K Color Computer with Disk.

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A discovery process of color and shape

Pattern Blocks: Reality Play

By Richard Ramella

Tinker Toys, Legos, Lincoln Logs, Construx, Erector Sets, Capsela and ordinary blocks . . . these are some of the building toys available for children.

Except for sleep, there may be no more peaceful time in family life than when a child is quietly playing with a toy comprised of modular units. Some important learning goes on during these imagination-fed activities. The real world, with many of its physical rules intact, is emulated in miniature. The relationships of shapes are made clear in pragmatic ways. Fractions, form, planning, art and engineering become tangible for the child. Best of all, the kid is just having fun!

Pattern Blocks is a 16K Extended Color BASIC shape game even young children can play. Older youngsters and adults may enjoy using it for more complex art. The game also has possibilities for students learning geometric shapes and fractions.

At the start, 10 shapes labeled 'A' through 'J' are printed at the right of the screen. These are made of rectangles and triangles, each drawn within a square. At the left of the screen, a block cursor flickers. Using the arrow keys moves this cursor among 64 positions, eight across and eight down. Pressing a letter from 'A' to 'J' sets that shape in place. It is set without its square boundary. Moving around the grid, the player can create complex patterns and outlines by using the 10 available shapes.

The shapes are all orange at the start of play. To change their colors, press '1' for blue, '2' for green and '3' for orange. Pressing the 'A' key fills an entire block in the current color, while the 'B' key blanks the position to white.

Keys 'C' through 'J' set their shapes into place by a rule determined with `GET/PUT` graphics. By using the OR alternative, these shapes are set over white areas as they exist, but their blank parts don't interfere with already set shapes. To test this, run the program and press the 'E' key to make an orange rectangle in the top of the square. Now press the '1' key to change the color set to green and press the 'F' key to set the bottom of the square in green. Move the cursor off the block to see the effect. Other mirror shapes may be combined in this way, however, setting one color over another can produce unpredictable results unless some study is made of opposites and complementaries.

In another experiment, go to a blank area and press 'C', then 'F'. Appropriate combinations of 'C' or 'D' with 'E' or 'F' result in four different arrangements of three-on, one-off.

To still the flashing cursor momentarily, press ENTER. Press the space bar to restore the cursor.

The program uses `POKE 65495,0` to speed up the graphics. If your machine won't work with this `POKE`, delete Line 130. In playing the game, always press keyboard number '0' (zero) to end a program run. This uses a `POKE` to bring the system back to normal speed. If you incorrectly end the program by pressing the BREAK key, you can't load and save cassette material or line print until you type `POKE 65494,0` and ENTER, or tur the computer off and on again.

In a classroom setting, a child ca work with the concepts of fractions an geometry using *Pattern Blocks.* teacher may challenge the child t create a house, a whirligig, a parallelogram, a diamond, etc. For another us of the program, delete Line 140, `GOT 180`. With this change, the progra begins with the prompt: ACROSS 1- DOWN 1-8? Answer by typing whol numbers separated by a comma and i the range of 1 to 8. The result is a bo drawn on the play area. The challeng may be, for example, to divide a thre by three square box into mirror shape of different colors, or equal areas i different shapes, or three equal shape of different colors. The complexity o the problem posed depends on th child's ability.

There are various possibilities for thi game as it is meant to be a discover process. I'm confident youngsters wil discover how to work *Pattern Blocks* i many different ways. As a toy, it involves the same kind of thinking as an other building toy. In my observations children have created wildly origina combinations of color and shape, intuitively learning and applying real worl rules. The results are as different as th children who create them: an 8-year-ol boy's robots and space ships, a 12-year old girl's pristine geometric patterns and the joyous chaos of a 3-year-old Like any building toy, *Pattern Block* worth is gauged by its imaginative uses

(You may contact the author with an questions about this program at 149 Mt. View Ave., Chico, CA 95926. Pleas enclose an SASE for a reply.) □

(Richard Ramella is a former newspaper editor who now works as a writer for a California hospital. He has published more than 200 Color Computer programs.)

```
280 ......161
420 .......87
550 ......243
END .....119
```

The listing: PTRNBLKS

```
100 REM * PATTERN BLOCKS * TRS-8
0 EXTENDED COLOR BASIC 16K
110 REM * BY RICHARD RAMELLA
120 CLS: PMODE 3,1: PCLS 1: COLO
R 3,1: SCREEN 1,1
130 POKE 65495,0
140 GOTO 180
150 INPUT "ACROSS 1-8, DOWN 1-8"
;A,D: A=INT(A): D=INT(D)
160 IF A<1 OR A>8 OR D<1 OR D>8
THEN CLS: GOTO 150
170 SCREEN 1,1: LINE(0,0)-(A*24,
D*24),PSET,B
180 DIM A(2,6),B(2,6),C(2,6),D(2
,6),E(2,6),F(2,6),G(2,6),H(2,6),
I(2,6),J(2,6),K(2,6)
190 U$=CHR$(94): D$=CHR$(10): L$
=CHR$(8): R$=CHR$(9)
200 V=4: GOSUB 520
210 N=0: FOR Y=1 TO 153 STEP 38
220 FOR X=200 TO 230 STEP 30: N=
N+1
230 DRAW "BM"+STR$(X-1)+","+STR$
(Y-1)+";C"+STR$(V)+"R25D25L25U25
"
240 K=X+23: L=Y+23
250 IF N=1 THEN PAINT(X+2,Y+2),V
,V: GET(X,Y)-(K,L),A,G
260 IF N=2 THEN GET(X,Y)-(K,L),B
,G
270 IF N=3 OR N=4 THEN LINE(X+12
,Y)-(X+12,Y+24),PSET
280 IF N=3 THEN PAINT(X+20,Y+20)
,V,V: GET(X,Y)-(K,L),C,G
290 IF N=4 THEN PAINT(X+2,Y+2),V
,V: GET(X,Y)-(K,L),D,G
300 IF N=5 OR N=6 THEN LINE(X,Y+
12)-(X+24,Y+12),PSET
310 IF N=5 THEN PAINT(X+2,Y+2),V
,V: GET(X,Y)-(K,L),E,G
320 IF N=6 THEN PAINT(X+2,Y+22),
V,V: GET(X,Y)-(K,L),F,G
330 IF N=7 OR N=8 THEN LINE(X,Y)
-(X+24,Y+24),PSET
340 IF N=7 THEN PAINT(X+22,Y+2),
V,V: GET(X,Y)-(K,L),G,G
350 IF N=8 THEN PAINT(X+2,Y+22),
V,V: GET(X,Y)-(K,L),H,G
360 IF N=9 OR N=10 THEN LINE(X,Y
+24)-(X+24,Y),PSET
370 IF N=9 THEN PAINT(X+22,Y+22)
,V,V: GET(X,Y)-(K,L),I,G
380 IF N=10 THEN PAINT(X+2,Y+2),
V,V: GET(X,Y)-(K,L),J,G
390 NEXT X,Y
400 Q$=INKEY$: IF Q$=CHR$(13) TH
EN GOSUB 720
410 FOR T=1 TO 2: GET(P,Q)-(P+23
,Q+23),K,G
420 PUT(P,Q)-(P+23,Q+23),K,PRESE
T: NEXT T
430 IF Q$="" THEN 400 ELSE IF Q$
="0" THEN POKE 65494,0: END
440 GG=INSTR("ABCDEFGHIJ",Q$)
450 K=P+23: L=Q+23: IF GG>0 THEN
 ON GG GOSUB 620,630,640,650,660
,670,680,690,700,710: GOTO 400
460 V=INSTR("1234",Q$): IF V>0 T
HEN V=V+1: GOTO 210
470 IF Q$=U$ AND Q>0 THEN Q=Q-24
480 IF Q$=D$ AND Q<168 THEN Q=Q+
24
490 IF Q$=L$ AND P>0 THEN P=P-24
500 IF Q$=R$ AND P<168 THEN P=P+
24
510 GOTO 400
520 DRAW"BM208,35;C2U6E3F3D3L3R3
D3"
530 DRAW"BM239,36;U9R4F1D3G1L3R3
F1D2G1L4"
540 DRAW"BM216,67;H2L3G2D4F2R3E2
"
550 DRAW"BM239,72;U7R3F2D4G2L3"
560 DRAW"BM208,111;R7L7U4R4L4U4R
7"
570 DRAW"BM238,111;U4R4L4U4R7"
580 DRAW"BM216,143;H2L3G2D4F2R3E
3L4"
590 DRAW"BM238,149;U8D4R7U4D8"
600 DRAW"BM211,179;R3L2D8L2R4"
610 DRAW"BM238,185;D1F2R3E2U6L2R
4"
620 PUT(P,Q)-(K,L),A,PSET: RETUR
N
630 PUT(P,Q)-(K,L),B,PSET: RETUR
N
640 PUT(P,Q)-(K,L),C,OR: RETURN
650 PUT(P,Q)-(K,L),D,OR: RETURN
660 PUT(P,Q)-(K,L),E,OR: RETURN
670 PUT(P,Q)-(K,L),F,OR: RETURN
680 PUT(P,Q)-(K,L),G,OR: RETURN
690 PUT(P,Q)-(K,L),H,OR: RETURN
700 PUT(P,Q)-(K,L),I,OR: RETURN
710 PUT(P,Q)-(K,L),J,OR: RETURN
720 EXEC 44539: RETURN
730 REM * END OF LISTING
```

Get cozy with your CoCo with these easy and useful programs especially for the beginner

Novices' Niche

Lottery Madness

4K

By Mark Ashby

Lotto Number Generator is for all of our readers who are lottery players. It will produce a group of either three or six random numbers for lottery numbers. If you get two numbers the same, return to the menu and try again.

The listing: LOTTOGEN

```
100 'LOTO NUMBER GENERATOR
110 'BY: MARK ASHBY
120 '(C)OPYRIGHT 1985
130 GOSUB 200
190 END
200 'LOTO MENU TRIPLE CHOICE OR
LOTO
205 'IF WHILE YOU RUN THE MAJOR
LOTTO YOU GET TWO NUMBERS THAT A
RE THE SAME RUN IT AGAIN.
210 CLS
220 PRINT@5,"WASHINGTON STATE LO
TTO"
230 PRINT@40,"NUMBER GENERATOR"
240 PRINT"----------------------
----------"
250 PRINT:PRINT
260 PRINT"   1> TRIPLE CHOICE"
270 PRINT:PRINT
280 PRINT"   2> MAJOR LOTTO"
290 PRINT:PRINT
300 PRINT"----------------------
----------";
310 PRINT"        BY: MARK ASHBY
"
320 PRINT"         (C) 1985
330 A$=INKEY$:IF A$="" THEN 330
340 IF A$="1" THEN 500 ELSE 350
350 IF A$="2" THEN 1000 ELSE 360
360 GOTO 330
500 'TRIPLE CHOICE NUMBER GENERA
TOR
510 CLS
520 PRINT" TRIPLE CHOICE NUMBER
GENERATOR"
530 PRINT"----------------------
----------
540 FOR X=1 TO 3
550 L(X)=INT(RND(9))
560 NEXT X
570 PRINT"RND #1=";L(1)
580 PRINT"RND #2=";L(2)
590 PRINT"RND #3=";L(3)
600 PRINT:PRINT:PRINT:PRINT:PRIN
T:PRINT:PRINT
610 PRINT" MAIN <M>ENU-----<Q>UI
T"
620 B$=INKEY$:IFB$="" THEN 620
630 IF B$="M" THEN 200
640 IF B$="Q" THEN CLS:END
650 GOTO 620
1000 'WASHINGTO STATE LOTTO NUMB
ER GENERATOR
1010 CLS
1020 PRINT"WASHINGTON LOTTO NUMB
ER GENERATR"
1025 PRINT"---------------------
-----------"
1030 FOR X=1 TO 6
1040 W(X)=INT(RND(40))
1050 NEXT X
1060 PRINT"RND #1=";W(1)
1070 PRINT"RND #2=";W(2)
1080 PRINT"RND #3=";W(3)
1090 PRINT"RND #4=";W(4)
1100 PRINT"RND #5=";W(5)
1110 PRINT"RND #6=";W(6)
1120 PRINT:PRINT
1140 PRINT" MAIN <M>ENU------<Q>
UIT"
1150 B$=INKEY$:IF B$="" THEN 115
0
1160 IF B$="M" THEN 200
1170 IF B$="Q" THEN CLS:END
1180 GOTO 1150
```

Keep That Date

16K

By Dave Musie

Calendar displays monthly calendars on your screen. Once a year, you will have to edit Line 60 in order to synchronize the program with the current year. Line 60 holds the date of the month on which the first Saturday lands.

The listing: CALENDAR

```
10 CLS
20 DIML2$(12),MO$(12),ED(12),SD(
12),MX$(12)
60 DATA4,1,1,5,3,7,5,2,6,4,1,6
70 DATA31,28,31,30,31,30,31,31,3
0,31,30,31
80 FORX=1TO12:READSD(X):NEXTX:FO
RX=1TO12:READED(X):NEXTX
90 DATAjan,feb,mar,apr,may,jun,j
ul,aug,sep,oct,nov,dec
100 FORX=1TO12:READMO$(X):NEXT
110 DATA JAN,FEB,MAR,APR,MAY,JUN
,JUL,AUG,SEP,OCT,NOV,DEC
120 FORX=1TO12:READMX$(X):NEXT
125 MO=1
126 D=1
130 GOSUB210:H=MO+1:GOSUB240:I$=
CHR$(94):GOTO160
140 GOSUB220
150 IFI$=CHR$(13) AND H<>MO THEN
MO=H:GOSUB210:GOSUB240
160 IFASC(I$)=94 AND H=1 THENPRI
NT@57+(32*H),MO$(H):H=12:PRINT@5
7+(32*H),MX$(H):GOTO140
170 IFASC(I$)=94 AND H>1 THENPRI
NT@57+(32*H),MO$(H):H=H-1:PRINT@
57+(32*H),MX$(H)
180 IFASC(I$)=10 AND H=12 THENPR
INT@57+(32*H),MO$(H):H=1:PRINT@5
7+(32*H),MX$(H):GOTO140
190 IFASC(I$)=10 AND H<12 THENPR
INT@57+(32*H),MO$(H):H=H+1:PRINT
@57+(32*H),MX$(H):GOTO140
200 GOTO140
210 CLS:DS=32:DL=2:F1=33:F2=1:W=
64:GOSUB260:DS=288:DL=258:F1=225
:F2=65:W=320:IFMO+1>12 THENRETUR
NELSEMO=MO+1:GOSUB260:DS=32:MO=M
O-1:RETURN
220 I$=INKEY$:IFI$="" THEN220
230 I=VAL(I$):RETURN
240 FORX=0TO11:PRINT@89+(32*X),M
O$(X+1):NEXT:PRINT@57+(32*H),MX$
(H):PRINT@480,"up/down arrows se
lect month    ";:RETURN
250 FORX=0TO6:PRINT@25+(32*X),MM
$(X+1);:NEXT:H=1:RETURN
260 PRINT@DL,"su mo tu we th fr
sa  " :FORX=0TO2:PRINT@DS+(32*X)
,MID$(MO$(MO),X+1,1):NEXT
270 FORX=1TO SD(MO):POKE137,F1+(
7-SD(MO))*3:PRINT@PEEK(137)+S+F2
,X:S=S+3:NEXTX
280 FORX=SD(MO)+1 TO 9:PRINT@W+D
+1,X:D=D+3:IFD=22 THEND=1:W=W+32
290 NEXTX
300 FORX=10TO ED(MO):PRINT@W+D,X
:D=D+3:IFD=22 THEND=1:W=W+32
310 NEXTX:D=1:S=0:RETURN
```

Cassette Library

32K

By Bob Hart

Skip Print prints a list of all files on a cassette to your printer. When you run the program it pokes a short machine language program into high memory. Make sure your printer is online and the play button on your cassette recorder is depressed, then type `EXEC &H7F00`.

If you wish to save the machine code after running the program, type: `CSAVEM "SKIPRINT",&H7F00,&H7F38,&H7F00` and press ENTER. To use the ML version, type `CLEAR200,&H7EFF:CLOADM"SKIPRINT":EXEC` and press ENTER.

The listing: SKIPRINT

```
10 ' SKIPRINT
20 '          BY BOB HART
30 CLS
40 CLEAR200,&H7EFF
50 AUDIO ON
60 FOR X=&H7F00 TO &H7F38
70 READ A:POKEX,A
80 NEXT
90 PRINT:PRINT"EXEC&H7F00 WHEN R
EADY..":END
100 DATA 141, 33, 23, 38, 192, 2
3, 39, 64, 189, 166
110 DATA 209, 16, 38, 39, 10, 14
2, 4, 2, 166, 128
120 DATA 141, 19, 189, 162, 191,
 140, 4, 10, 38, 244
130 DATA 141, 3, 126, 127, 2, 13
4, 13, 189, 162, 191
140 DATA 57, 129, 96, 36, 5, 129
, 26, 35, 4, 57
150 DATA 128, 64, 57, 139, 96, 5
7, 255
```

One Moment Please

16K ECB

By Bill Bernico

Countdown is a simple subroutine that can be used in programs as a pause feature while programs are preparing to do something else.

This demonstration allows for up to 60 seconds to tick away before ending. *Countdown* can be modified to any time span by changing Line 90 to read `IF X<1 THEN 90`, leaving out the `OR X>60`.

The listing: `COUNTDWN`

```
10 A$="BR3BUU2ERFD2GLNHBR2
20 B$="NU4
30 C$="BR3NR4U2R3U2NL3BD4
40 D$="BR3R3U2NL2U2NL3BD4
50 E$="BR3BU4D2R3U2D4
60 F$="BR3R3U2L3U2R3BD4
70 COLOR 1,0:PMODE 4,1:PCLS 5
80 CLS:INPUT"SECONDS TO COUNTDOW
N: ";X
90 IF X<1 OR X>60 THEN 80
100 SCREEN 1,1
110 CIRCLE(128,96),77,0
120 DRAW"BM15,4S8C0HL2GD4FR2EBDB
R4HU4ER2FD4GNL2BR4BUNU5FR2ENU5BD
BR3U6F4NU4D2BR3BU6R4L2D6BR60RU6N
LR2FD4GNL2BR5HU4ER2FD4GNL2BR4NU6
E2UDF2NU6BR3U6F4NU4D2
130 DRAW"BM124,15S4C0"+A$
140 DRAW"BM79,26"+F$+F$
150 DRAW"BM47,55"+F$+A$
160 DRAW"BM35,96"+E$+F$
170 DRAW"BM47,137"+E$+A$
180 DRAW"BM79,169"+D$+F$
190 DRAW"BM120,180"+D$+A$
200 DRAW"BM164,168"+C$+F$
210 DRAW"BM194,138"+C$+A$
220 DRAW"BM208,98"+B$+F$
230 DRAW"BM194,55"+B$+A$
240 DRAW"BM163,26"+F$:DRAW"C1
250 X=90-X
260 FOR T=X TO 90
270 A=(2*3.1415)*T/60
280 LINE(128,96)-(75*SIN(A)+128,
75*COS(A)+96),PRESET
290 FOR Y=1 TO 600:NEXT Y
300 EXEC43345
310 LINE(128,96)-(75*SIN(A)+128,
75*COS(A)+96),PSET
320 NEXT T
330 FOR E=1 TO 4
340 SOUND 191,2
350 NEXT E
360 GOTO 80
```

Characters, Codes and Locations

16K ECB

By John O'Keefe

CoCo Reference Sheet is a useful little utility that prints a list of all printable ASCII codes, important memory locations and special ASCII codes. It is configured for Radio Shack printers, but can easily be converted for other printer brands by changing control codes.

Be sure your printer is online before running this program.

The listing: `REFSHEET`

```
10 '*****************************
20 '*    COCO REFERENCE SHEET   *
30 '*    BY JOHN O'KEEFE        *
40 '*    SUMMER OF 1984         *
50 '*****************************
60 DIMX$(500)
70 CLS
80 X$="COLOR COMPUTER REFERENCE
SHEET":GOSUB 400
90 PRINT #-2,"":X$="ASCII CHARAC
TAR CODES":GOSUB 400 :PRINT#-2,"
"
100 FOR F=32 TO 126:X$(F)=CHR$(F
):NEXT F
110 FOR F=32 TO 126 STEP 5
120 PRINT#-2,X$(F);"(";F;")",X$(
F+1);"(";F+1;")",X$(F+2);"(";F+2
;")",X$(F+3);"(";F+3;")",X$(F+4)
;"(";F+4;")"
130 NEXT F
140 PRINT#-2,"":X$="PERTINANT ME
MORY LOCATIONS":GOSUB 400:PRINT#
-2,""
150 PRINT #-2,"  DESCRIPTION
    ","DECIMAL","HEXIDECIMAL"
160 PRINT #-2,""
170 PRINT#-2,"  (1) VIDEO TEXT M
EMORY","1024-1535","0400-05FF"
```

```
180 PRINT #-2,"  (2) DISK GRAPHI
CS PAGES","2440","0988"
190 PRINT #-2,"  (3) BASIC GRAPH
ICS PAGES","1535","05FF"
200 PRINT #-2,"  (4) HIGH SPEED
POKE","65495,0","FFD7,0"
210 PRINT #-2,"  (5) SPEED POKE
OFF","65494,0","FFD6,0"
220 PRINT #-2,"  (6) UP ARROW
   ","341","155"
230 PRINT #-2,"  (7) DOWN ARROW"
,"342","156"
240 PRINT #-2,"  (8) <- ARROW
   ","343","157"
250 PRINT #-2,"  (9) -> ARROW
   ","344","158"
260 PRINT #-2,"  (0) SPACE BAR
   ","345","159"
270 PRINT #-2,""
280 PRINT #-2, "  NUMBERS (6)-(0
) CONTAIN DECIMAL 247 AS LONG AS
 KEY IS DEPRESSED."
290 PRINT #-2,"":X$="SPECIAL ASC
II CODES":GOSUB 400:PRINT #-2,""
300 PRINT #-2,"KEY","UNSHIFTED",
"SHIFTED","UNSHIFTED","SHIFTED"
31  PRINT #-2,"":PRINT #-2,"BREA
K' "3","3","3","3"
3 .0 PRINT #-2,"CLEAR","0C","5C",
'12","92"
330 PRINT #-2,"ENTER","0D","0D",
"13","13"
340 PRINT #-2,"SPACE","20","-","
32","32"
350 PRINT #-2,"UP ARROW","5E","5
F","94","95"
360 PRINT #-2,"DOWN ARROW","0A",
"5B","10","91"
370 PRINT #-2,"<- ARROW","08","1
5","8","21"
380 PRINT #-2,"-> ARROW","09","5
D","9","93"
390 END
400 Z=LEN(X$):PP=INT((80-Z)/2):S
$=STRING$(PP," "):PRINT#-2,S$;X$
:RETURN
```

CoCo Crayons

4K

By Thomas Betz

JoyColor uses block graphics and makes use of all eight colors. To use the program, be sure both joysticks are connected to the computer. If you have a self-centering joystick, use it on the right side, as the left joystick must be free floating.

After running *JoyColor*, you will see a small, colored block in the lower left-hand corner of your screen, as well as a point in the middle. The point in the middle indicates the cursor position. It is controlled by the right joystick. Moving it to any position other than center will cause a line to be drawn in that direction, including diagonally. By holding in either firebutton, the cursor can be moved without leaving a point changed.

The left joystick causes the cursor color to change, as indicated by the block in the lower corner. The left joystick has nine imaginary positions as in a tic-tac-toe grid. Each of these positions represents one of eight colors with the exception of the upper left-hand position, which produces a green block with a question mark in the corner. Drawing with this color produces a green point only if the current cursor block has not already been set to another color. If it has, then the new point is set to the color of that block. If you hold in either firebutton while using this color, the cursor sets its current point to black, thereby erasing colors already set. To clear the screen, press both firebuttons simultaneously.

If you're using disk, you can save and load a drawing with the 'S' and 'L' keys by adding this line: `32 X$=INKEY$:IFX$=″S″THENSAVEM″DRAWING″,1023,1535,44539 ELSEIFX$=″L″THENLOADM″DRAWING.` Happy coloring!

The listing: `JOYCOLOR`

```
10 '    *JOYCOLOR SKETCH*
15 '    *  BY TOM BETZ   *
20 '    *    (C) 1985    *
25 CLS0:X=31:Y=15
30 A=JOYSTK(0):B=JOYSTK(1)
35 IFA<9THEN X=X-1
40 IFA>54THEN X=X+1
45 IFB<9THEN Y=Y-1
50 IFB>54THEN Y=Y+1
55 IFX<0THEN X=0
60 IFY<0THEN Y=0
65 IFX>63THEN X=63
70 IFY>31THEN Y=31
75 A=JOYSTK(2):B=JOYSTK(3)
80 C=INT(A/31)+1+INT(B/31)*3-1
85 POKE1504,127+(C*16)
90 P=PEEK(65280):W=POINT(X,Y)
95 IFP=127THENSET(X,Y,C):GOTO30
100 IFP=255THENSET(X,Y,C):GOTO30
105 IFP=124THEN25
110 IFP=252THEN25
115 IFC=0THENRESET(X,Y):GOTO30
120 SET(X,Y,0)
125 FORQ=1TO20:NEXT
130 IFW=0THENRESET(X,Y)
135 GOTO30
```

Picture Inverter

16K ECB

By Eric W. Tilenius

Here is a nice utility for inverting your `PMODE 3` or `4` graphics screens. It makes inverse black-and-white and color pictures.

To use *Inverter*, get the picture you want on the `PMODE 4` graphics screen. Then, either type in or load from disk or cassette the program listed below and run it. The program will produce the "photographic negative" of the picture.

Hitting the 'I' key returns the picture to normal. Any other key exits the program. To save the inverted picture, type `SAVEM"FILENAME",&HE00,&H25FF,&HA027` for a disk system or `CSAVEN"FILENAME",&H600,&H1DFF,&HA027` for cassette. To load the picture back in, simply type `(C)LOADM"FILENAME"`. The picture will then be on the `PMODE 4` and `PMODE 3` screens. Try it on all your favorite pictures.

The listing: `INVERTER`

```
10 REM :::::TAKES 16K ECB::::
20 REM ***PICTURE INVERSER***
30 REM !!!A SHORT  UTILITY!!!
40 REM >TO INVERSE  PICTURES<
50 REM
      1985 BY ERIC W. TILENIUS
60 PCLEAR 4
70 DIM V(100,1,1)
80 PMODE 4,1:SCREEN 1,1
90 GET (0,0)-(255,1),V
100 FOR C=0 TO 191
110 PUT (0,C)-(255,C),V,NOT
120 NEXT C
130 I$=INKEY$:IF I$="I" THEN RUN
 ELSE IF I$="" THEN 130
140 END
150 REM * BE SURE TO HAVE THE
PICTURE YOU WISH INVERSED ON THE
SCREEN BEFORE RUNNING THIS.
```

For Good Measure

16K ECB

By Bill Bernico

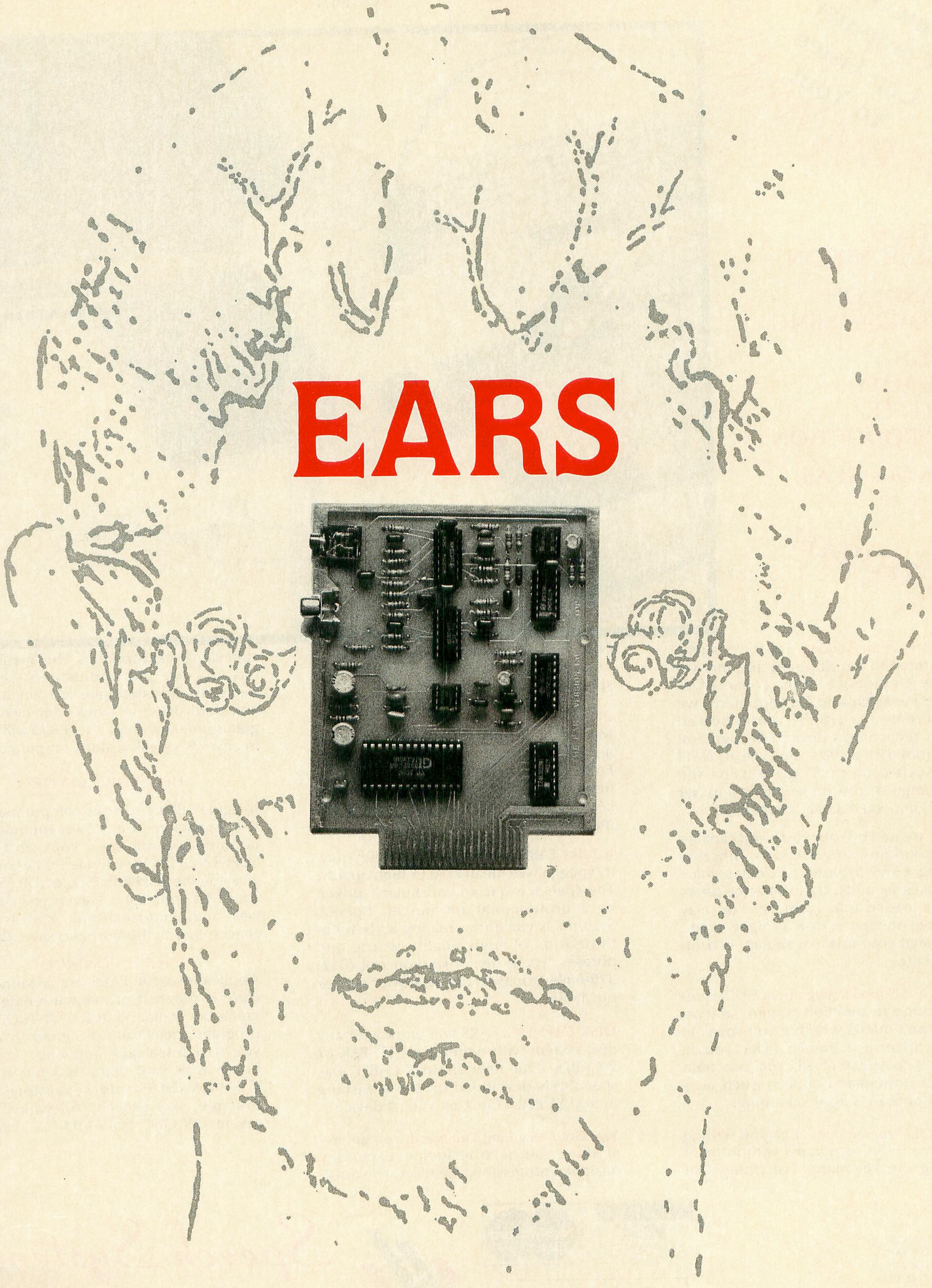
Ever wonder how many inches it takes to make up a mile? Or, how many inches and feet there are in 2,417 yards? *Convert* will help answer these questions.

Your only prompt will ask for the number of inches. You may enter any number up to 99,999,999 and *Convert* breaks down those inches into three categories: 1) yards, feet and leftover inches, 2) miles with up to three decimal places, and 3) feet with leftover inches.

The listing: `CONVERT`

```
10 'FEETINCH
20 'BY BILL BERNICO
30 '708 MICHIGAN AVE.
40 'SHEBOYGAN, WI 53081
50 '(414) 459-7350
60 '
70 CLS
80 SOUND 191,1
90 INPUT"NUMBER OF INCHES";I
100 IF I>99999999 THEN 70
110 PRINT STRING$(32,"-");
120 Y=INT(I/36)
130 F1=INT(I/12)
140 Y1=F1/3
150 YI=I-36*Y
160 F=INT(YI/12)
170 FI=YI-F*12
180 M=Y/1760
190 M$="###,###.###"
200 LY$="#,###,###
210 LF$="#,###,###,###
220 SOUND 100,1
230 PRINT
240 PRINT USING LY$+" ";Y;
250 PRINT"YD.";F;"FT.";FI;"IN.
260 GOSUB 480
270 PRINT
280 PRINT TAB(15)"or
290 SOUND 145,1
300 PRINT
310 PRINT TAB(4)
320 PRINT USING M$;M;
330 PRINT" MILES
340 GOSUB 480
350 PRINT
360 PRINT TAB(15)"or
370 SOUND 50,1
380 PRINT
390 PRINT USING LF$;F1;
400 PRINT" FT.";FI;"IN.
410 PRINT@484,"HIT ANY KEY TO TR
Y AGAIN";
420 FOR X=1508 TO 1531
430 POKE X,PEEK(X)-64
440 EXEC 43345
450 NEXT X
460 EXEC 44539
470 RUN
480 FOR X=1 TO 750
490 NEXT X
500 RETURN
```

EARS



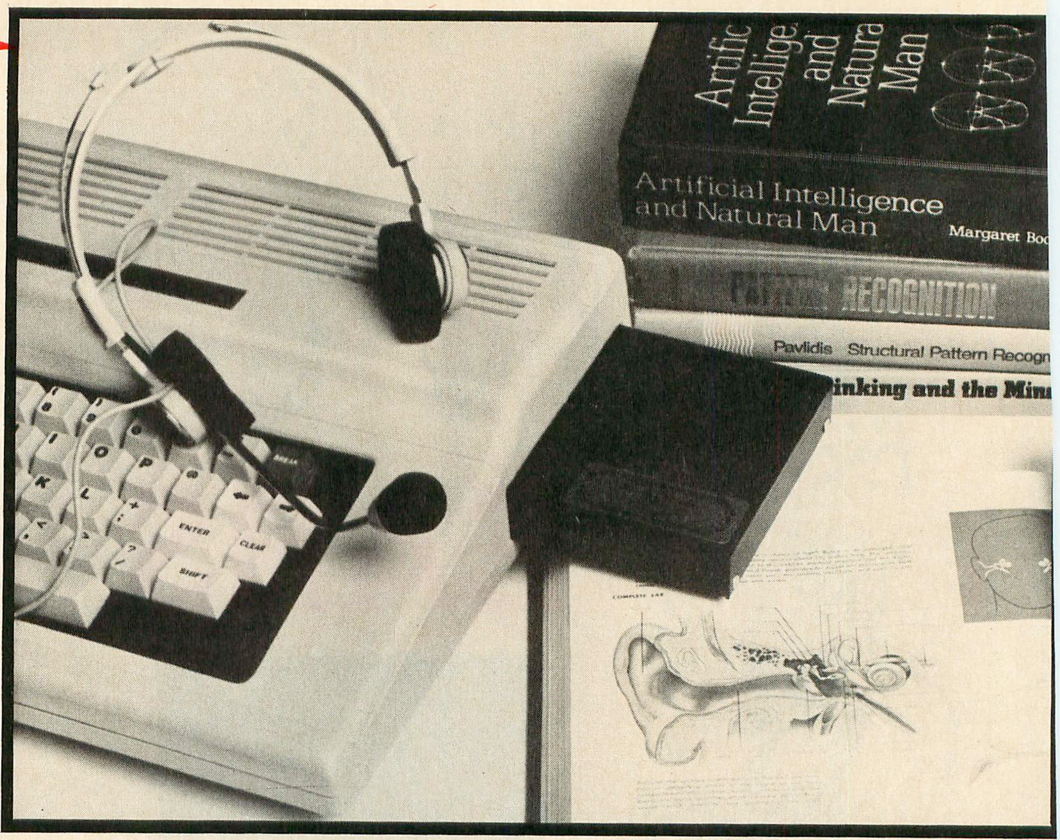
Electronic Audio Recognition System

Now Your Computer Can Listen To You!

EARS™

Electronic
Audio
Recognition
System

$99.95


Artificial Intelligence and Natural Man
Margaret Bo
PATTERN RECOGNITION
Pavlidis Structural Pattern Recogn
inking and the Min

- SPEECH RECOGNITION
- HANDS OFF PROGRAMMING
- HIGH QUALITY SPEECH REPRODUCTION

EARS Does It All!

INCREDIBLE!

Two Years In the Making. Speech Systems was formed to develop new and innovative speech products. After 2 years of intensive Research and Development, we have created a truely sophisticated speech recognition device. Recognition rates from 95% to 98% are typical. Until now, such a product was outside the price range of the personnel computer market, and even small businesses.

EARS is trained by your voice and capable of recognizing any word or phrase. Training EARS to your particular voice print takes seconds. Up to 64 voice prints may be loaded into memory. You may then save on tape or disk as many as you like so that your total vocabulary is virtually infinite.

Speech and Sound Recognition. EARS is really a sound recognition system, so it really doesn't matter whether you speak in English, Spanish, or French. In fact you do not have to speak at all, you can train EARS to understand sounds such as a musical note or a door slamming.

Hands Off Programming. Imagine writing your own BASIC programs without ever touching the keyboard. Everything that you would normally do through a keyboard can now be done by just speaking.

Programming EARS Is Easy. LISTEN, MATCH and other commands have been added to BASIC so that programming EARS is a piece of cake! The single BASIC line: 10 LISTEN: MATCH will instruct EARS to listen to you and return the matching phrase.

It Talks. EARS is also capable of high quality speech. We mean REALLY high quality. The speech is a fixed vocabulary spoken by a professional announcer. Speech Systems is currently creating a library of thousands of high quality words and phrases. For a demonstration call **(312) 879-6844**, you won't believe your ears or our EARS.

DISK OWNERS. EARS will work with any disk system with either a MULTI-PAK or Y-CABLE. Our new Triple Y-CABLE was specifically developed for those wishing to add SUPER VOICE as a third device.

You Get Everything You Need. You get everything you need including a specially designed professional headset style noise cancelling microphone. The manual is easy to use and understand. Several demonstration examples are included so you don't have to write your own programs unless you want to. EARS will work in any 32K or 64K Color Computer.

SUPER VOICE $20 OFF

Imagine talking to your computer and it talking back to you. When you need an unlimited vocabulary, you can't beat SUPER VOICE. For a limited time, we will give you the SUPER VOICE for $59.95 with your EARS purchase. Even if you already have another speech unit, here is your chance to buy the best and save $20.

VOICE CONTROL

Applications for EARS are astounding. Here is our first of many listening programs to come. VOICE CONTROL is a program specifically designed to allow you to control any appliance in your house with your voice and our HOME COMMANDER (sold separately). For example, you can control your TV by saying "TV ON" or TV OFF". $24.95

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'SUPER VOICE' T.M.

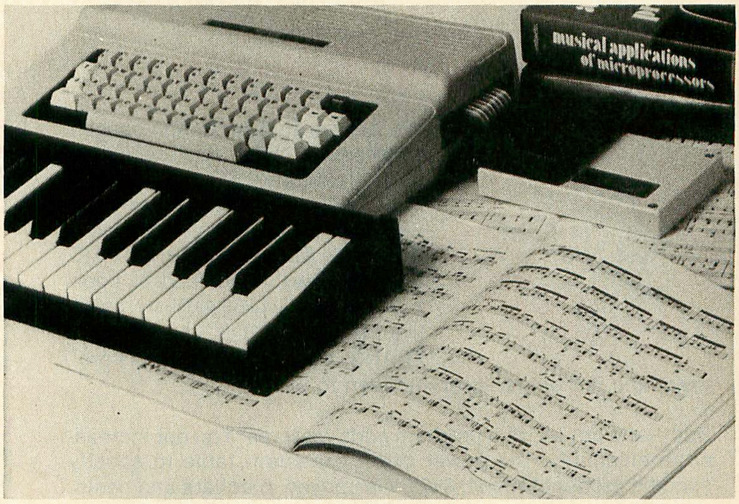
COCO'S MOST ADVANCED SPEECH SYNTHESIZER.

IT TALKS, SINGS AND MORE.

only . . . $79.95

WITH EARS OR PIANO KEYBOARD PURCHASE

only . . . $59.95



SUPER VOICE is no ordinary speech synthesizer. It uses Silicon Systems, Inc. SSI-263, the most advanced speech/sound chip available. SUPER VOICE is not only capable of highly intelligible speech, sound effects, and singing over a 6 octave range, but now we have turned SUPER VOICE into a monophonic Super Music Synthesizer with our PIANO KEYBOARD.

IT TALKS. A free TRANSLATOR text-to-speech program makes writing your own talking program as easy as SAYING "HELLO."

SUPER VOICE works in any 32K or 64K computer. A disk system requires a Y-Cable or Multi-Pak.

FREE "REACTION" To Test Your Reflexes

FREE SUPER VOICE SINGS THE STAR SPANGLED BANNER

FREE "SIMON" To Test Your Memory

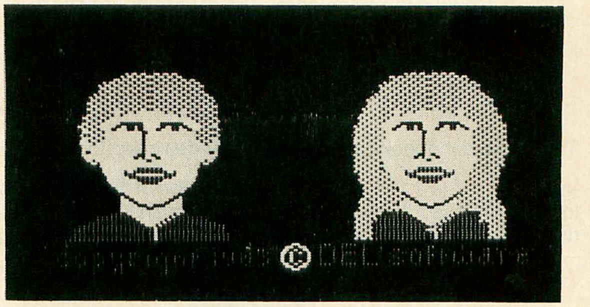
Here are the facts; the decision is yours.

	SUPER VOICE	REAL TALKER	RS SPEECH CARTRIDGE	VOICE-PAK
Synthesizer Device	SSI-263	SC-01	SP-256	SC-01
Speaking Speeds	16	1	1	1
Volume Levels	16	1	1	1
Articulation Rates	8	1	1	1
Vocal Tract Filter Settings	255	1	1	1
Basic unit of Speech	64 phonemes 4 durations each	64 phonemes	64 allophones 5 pause lengths	64 phonemes
Pitch Variations	4096 (32 absolute levels with 8 inflection speeds)	4	1	4

FOOL'S CROSSING

The world's first TALKING HI-RES GRAPHICS adventure. Finding the hidden treasure is the easy part, getting back home is another story.

32K Disk $24.95



SUPER TALKING HEADS

When the SUPER VOICE speaks in a low pitched voice, the man speaks, when a high pitched voice is used the woman speaks. $24.95

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‘TALKING SOFTWARE’

FOR THE VOICE, SUPER VOICE ™, RS SPEECH & SOUND PAK

RADIO SHACK® SPEECH & SOUND TRANSLATOR

FREE
When you buy
any 5 of our
Talking Programs

We believe that no COCO speech synthesizer gives you the power and flexibility of the SUPER VOICE. Nevertheless, some have decided to go with the Radio Shack SPEECH & SOUND PAK. For those we've decided to open our TALKING LIBRARY by offering the SPEECH & SOUND TRANSLATOR . Just load this program and our entire library is open to you.

But that's not all, this program adds features. You get increased intelligibility, the power of an exception table to specify specific pronunciations, $12.81 is spoken in dollars and cents, 1,234,567 is spoken in millions, thousands, and hundreds, and much more. **$24.95**

TERMTALK All the features of an intelligent telecommunications program plus what appears on the TV is spoken.

- Upload and Download programs
- Full or Split Screen
- Normal or Reverse Video
- Control Xmit Protocols
- Buffer Editing
- It talks

Please specify version (VOICE or RS SPEECH & SOUND PAK)
Tape **$39.95** Disk **$49.95**

TALKING BINGO BINGO was never like this. The VOICE or SUPER VOICE makes all the calls while you sit back and play. Comes with 20 playing cards and 200 markers. High Resolution graphic screen, 3 timing level, ball count and pause control. **$24.95**

ESTHER the talking psychoanalyst. An excellent example of artificial intelligence. She may not solve all your problems, but her insight will amaze you. Just like the original Eliza. **$24.95**

SCORE E-Z A yahtzee type game. Up to six can play. **$24.95**

ADVENTURES

CULT OF THE CAVE BEAR You're a stranded time traveler 50,000 years in the past. Can you fix your time machine while still surviving in this alien environ, and make it back? **$29.95**

SHIP HUNT Play Battleship with your CoCo. All status reports are spoken. Ready battery, aim, fire at will! **$24.95**

FINAL COUNTDOWN You must stop the mad general from launching a missile at Moscow and causing WW III. Has multiple voices for added realism. **$24.95**

STAR TALK You're the Star Fleet Captain. Your mission...destroy the enemies' Dragon Star Ships. All status reports are spoken! **$24.95**

FOOL'S CROSSING The world's first TALKING HI-RES GRAPHICS adventure. Finding the hidden treasure is the easy part, getting back home is another story. **$24.95**

ADVENTURE GENERATOR Create talking adventure games that are 100% Machine Language. Up to 99 rooms, 255 objects, 70 command words and 255 conditional flags. 64K Disk **$39.95**

SUPER VOICE SONGBOOKS

These two songbooks were specifically designed for the SUPER VOICE, the only speech synthesizer flexible enough to allow singing.

VOLUME I (POTPOURRI) A collection of miscellaneous tunes for everyone. Songs include: How Much Is That Doggie in the Window, Daisy, Aloha Oe, Old McDonald and more. **$19.95**

VOLUME 2 (NURSERY RHYMES) Includes: Twinkle Twinkle Little Star, Mary Had A Little Lamb, 3 Blind Mice, the Alphabet Song and more. May be used with SUPER TALKING HEADS so they (Paul & Pauline) sing the songs. **$19.95**

EDUCATION

ANIMATED SENTENCES The child builds complete sentences from a graphic menu using keyboard or joystick. The action is then spoken and acted out graphically. It's a great way to learn the parts of speech (i.e. verb, subject, noun, etc.). **$24.95**

KING AUTHOR'S TALES A creative writing tool to allow a child to write compositions, or short stories. Q & A option is also included. **$29.95**

COLOR MATH Addition, Subtraction, Multiplication, and Division are mastered. Student may specify difficulty level. **$24.95**

SPELL-A-TRON Student builds a dictionary of words to be quizzed on. Perfect for Spelling B. **$24.95**

SPELLING TESTER A graphic spelling game. The student is shown objects to be spelled. **$9.95**

POETRY CREATOR The VOICE speech unit is used to speak poetry that is created. **$9.95**

SHORT STORY MAKER A program to create and speak stories created by the child. **$9.95**

Season's
Greetings
From
Speech
Systems

FOREIGN LANGUAGE Learn a foreign language. French dictionary is included. **$9.95**

PRESIDENTS The student is able to master the Presidents of the U.S. **$9.95**

STATES A program designed to aid the student in learning correct spelling of the states. **$9.95**

CAPITALS Learning the State's Capitals is made more interesting using speech. **$9.95**

HANGMAN A word guessing game. You must guess the word before you hang. **$9.95**

MATH DRILL A program to help teach arithmetic. **$9.95**

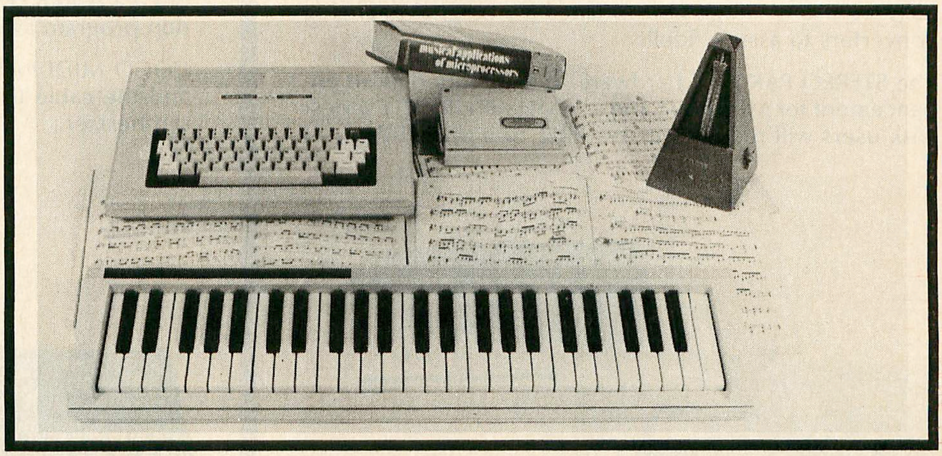
All software, except as noted, shipped on tape but may be moved to disk.

SYMPHONY 12™

A 12 VOICE POLYPHONIC STEREO MUSIC SYNTHESIZER

$79.95 $69.95 WHEN PURCHASED WITH MUSICA 2 $59.95 WHEN PURCHASED WITH THE PIANO KEYBOARD

- 12 SIMULTANEOUS VOICES
- STEREO & MONO
- 4 NOISE GENERATORS
- SOUND EFFECTS
- PLAYS AND CREATES MUSICA 2 FILES



SUPER POLYPHONIC. Speech Systems is proud to bring you SYMPHONY 12, a polyphonic 12 voice hardware stereo music synthesizer for the Color Computer. SYMPHONY 12 also gives you 4 noise generators for percussion synthesis and sound effects. The PIANO KEYBOARD and MUSICA 2 (sold separately) turns your COCO into a real music machine with incredible flexibility.

STEREO and MONO. By connecting SYMPHONY 12 to your home stereo system, music is produced in stereo, 6 voices from each channel. However, you don't need to have a stereo system, all 12 voices also come out of your TV or monitor.

PICK AN INSTRUMENT. SYMPHONY 12 lets you choose from 10 preset instruments to synthesize chimes, violin, oboe, banjo, harpsichord, piano and more. You can even change instruments as the music plays.

SOUND EFFECTS. SYMPHONY 12 is a sophisticated sound generator. 12 voices and 4 noise generators give you incredible sound effect capability. We have included gun shot, explosion, racing car and more.

WATCH IT PLAY. As SYMPHONY 12 plays, a graphics display of a piano keyboard shows the notes playing. The display is entertaining as well as very educational.

PLAY MUSICA 2 FILES. Thousands of MUSICA 2 users will be excited to know SYMPHONY 12 plays all music developed using MUSICA 2 like you have never Seen or Heard it. In fact we highly recommend the use of MUSICA 2 as a composition development tool for SYMPHONY 12. Use MUSICA 2's superior graphics input capability and then play it through SYMPHONY 12. You can also take advantage of our MUSIC LIBRARY series (sold separately) to give you access to over 500 music pieces representing 20 hours of music.

ULTIMATE MUSIC DEVELOPMENT SYSTEM. SYMPHONY 12, MUSICA 2, and the PIANO KEYBOARD give you incredible flexibility. Imagine sitting down at the PIANO KEYBOARD, playing a piece and recording it as you play just as you would to a tape recorder. Save your masterpiece and then using MUSICA 2 edit it if you like and print it. If you have a MIDI synthesizer, you can take the music and play it using COCO MIDI (sold separately). Try that on an IBM, APPLE, or COMMODORE (good luck).

PIANO KEYBOARD. For those wishing to turn SYMPHONY 12 into a real polyphonic synthesizer we offer the extremely powerful and versatile PIANO KEYBOARD. The PIANO KEYBOARD was deisgned to be used in our entire music product line. You can use it with SYMPHONEY 12, MUSICA 2, SYNTHER 77 PLUS, and even our advanced speech synthesizer, SUPER VOICE.

When using MUSICA 2, you will be using 4 of the 12 voices available from SYMPHONY 12. To take advantage of the full 12 voice capability of SYMPHONY 12 you may use either the Color Computer's keyboard or the PIANO KEYBOARD.

Y-CABLE or MULTI-PAK. Tape users using both SYMPHONY 12 and the PIANO KEYBOARD will require a Y-CABLE. Disk users will require the Triple Y-Cable or MULTI-PAK.

SYMPHONY 12. You get over a dozen music and sound effect selections and complete documentation. Software is shipped on Tape or Disk.

OPTIONS

MUSIC LIBRARY (each volume)	$29.95
MUSICA 2	$29.95
PIANO KEYBOARD 2½ octave	$79.95
PIANO KEYBOARD 4 octave	$119.95

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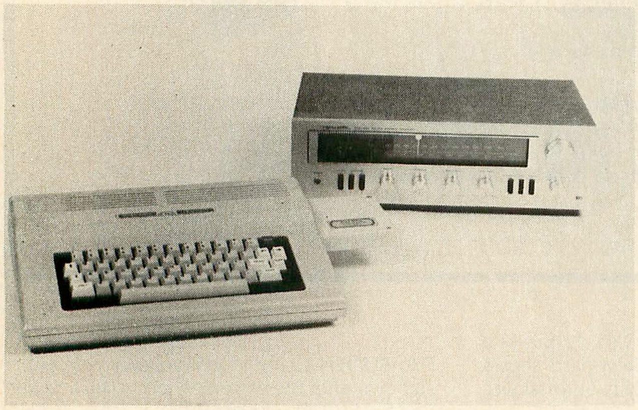
AWESOME

STEREO PAK™ $39.95

Plug this gem into your computer, connect to your home stereo system and sit back and enjoy music realism. The STEREO PAK is a hardware music synthesizer that plays our MUSIC LIBRARY series and MUSICA 2 music in stereo. Because it was designed specifically with music reproduction in mind, the sound is superb. The highs are crisp and clear while the bass notes will rattle your walls. Internally we use two high performance 8 bit digital to analog converters to assure fidelity.

The STEREO PAK is all hardware. It is intended as an enhancement for MUSICA 2 and our MUSIC LIBRARY series. Disk users will require our Y-CABLE or a MULTI-PAK.



NEW

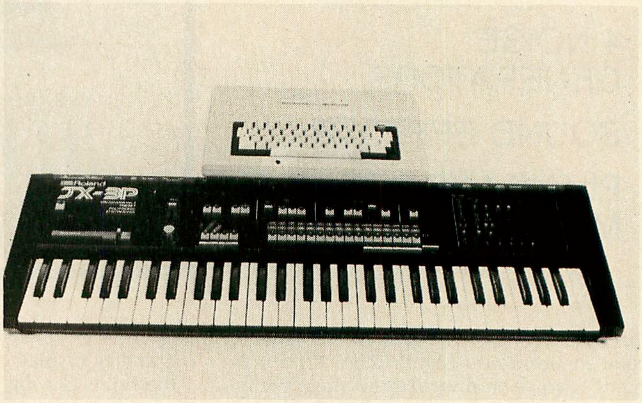
COCO MIDI™ $39.95

Tape or Disk

Now your COCO can talk to your MIDI music synthesizer. Whether you have a Korg, Roland, Casio, or Yamaha, it doesn't matter as long as it's MIDI equipped.

COCO MIDI takes any MUSICA 2 music file and plays it through your music synthesizer. We offer you over 500 tunes from our MUSIC LIBRARY series (sold separately) or create your own music using the best music composition program available, MUSICA 2 (sold separately).

COCO MIDI includes: documentation, plenty of music, and the cable to connect between the COCO and your synthesizer.



20 HOURS OF MUSIC

MUSIC LIBRARY™ $29.95

Tape or Disk

The MUSIC LIBRARY series consists of 5 volumes: 100, 200, 300, 400, and 500 each sold separately. Each contains over 100 four voice music selections with a playing time of over 3 hours each. The disk version is shipped on 5 full disks. When coupled with the STEREO PAK, the music is reproduced with unsurpassed realism.

A JUKEBOX program is included to allow you to select specific songs or automatically play each. These songs are ready to go, you don't need MUSICA 2 or a knowledge of music. MUSICA 2 users may customize each song. Requires minimum of 32K.

MUSIC LIBRARY 100

Stage, Screen, & TV
Music of the 70's
Music of the 60's
Music of the 50's
Old Time Favorites
Classical
Christmas (popular)
Christmas (traditional)
Patriotic
Polka Party

MUSIC LIBRARY 200 (another 100 selections)
MUSIC LIBRARY 300 (another 100 selections)
MUSIC LIBRARY 400 (another 100 selections)
MUSIC LIBRARY 500 (another 100 selections)

Each volume sold separately, specify tape or disk.

SAVE $50!

Write for complete list.

ALL 500 $99.95

NEW

SYNTHER 77 PLUS $29.95

Disk

We put the PLUS in SYNTHER 77 PLUS by connecting our PIANO KEYBOARD so you can really play your COCO like a piano.

You control vibrato pattern, Bender rate, Volume level as well as Attack, Decay, Sustain, and Release (ADSR envelope). As you play you can record, then edit and save it to disk or tape. You can even fine tune it to match other instruments.

The PIANO KEYBOARD is not necessary, you can use your COCO keyboard but the PIANO KEYBOARD makes your COCO a real music instrument.

FOR
MUSICA 2
SUPER VOICE
SYMPHONY 12
SYNTHER 77

PIANO KEYBOARD

Now you can really play your Color Computer and pick any or all 4 instruments: **MUSICA 2, SYNTHER 77 PLUS, SUPER VOICE,** and the ultimate **SYMPHONY 12.**

MUSICA 2 users can use the PIANO KEYBOARD as an easy method to input music. Version 2.7 is required. Previous users may obtain an update by returning original tape or disk with $7.00.

SYNTHER 77 PLUS turns your COCO into a music synthesizer without any additional hardware. You specify Vibrato, Bender, Volume, as well as Attack, Decay, Sustain, and Release (ADSR).

SUPER VOICE, COCO's most advanced speech synthesizer becomes a music synthesizer when connected to the PIANO KEYBOARD.

SYMPHONY 12 and the PIANO KEYBOARD gives you a professional 12 voice music synthesizer.

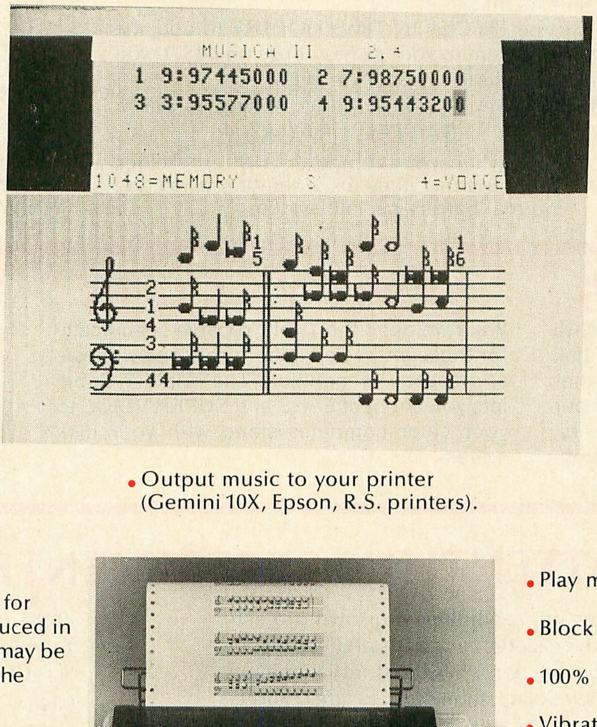
These Piano Keyboards are not toys. They are the same style, shape, size, and feel as professional synthesizer keyboards. Disk owners must use a Y-CABLE or MULTI-PACK.

2½ octave (32 note)	**$79.95**	**4 octave** (49 note)	**$119.95**

MUSICA 2 **$29.95**

Tape or Disk

- When in stereo mode, music is played through our STEREO PAK (purchased separately).
- Loudness of each voice may be individually specified.
- Memory available is constantly displayed.
- Voice waveshapes may be exchanged between voices at any point.
- Tempo may be specified and may even be altered as the music plays.
- Flats and sharps supported.
- Billions of timbre combinations.
- High resolution graphic display, looks just like sheet music.
- MUSICA 2 is 100% software, no need for hardware unless you want music produced in STEREO. In that case, the STEREO PAK may be purchased separately. It's a must for the audiophile!
- Repeat bars allow repeating of music without re-inserting music a second or third time.
- 30 page manual describes all.
- Requires minimum of **64K**



```
         MUSICA II     2.4
   1 9:97445000  2 7:98750000
   3 3:95577000  4 9:95443200
1048=MEMORY       3        4=VOICE
```

- Output music to your printer (Gemini 10X, Epson, R.S. printers).

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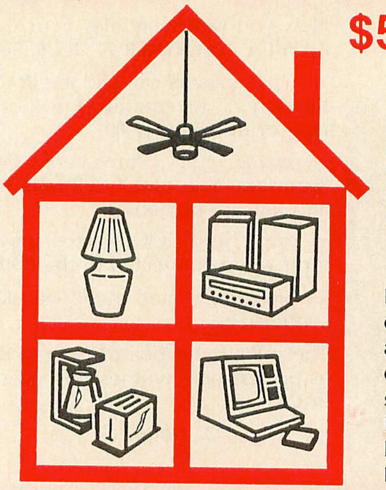

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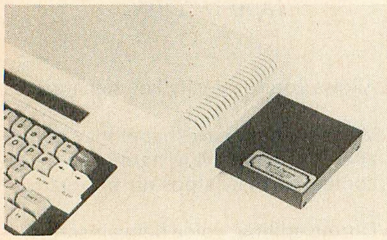

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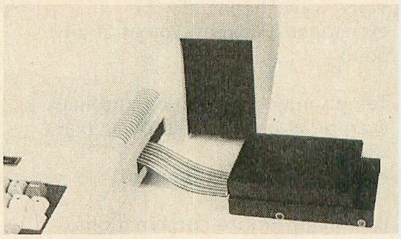

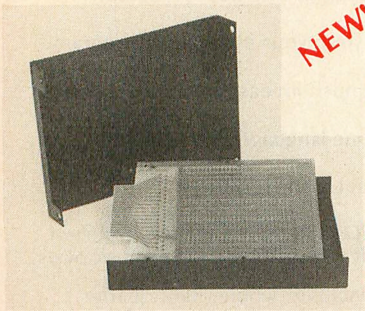

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A simple program with a familiar tune that demonstrates your computer's music and graphics capabilities . . .

Color My CoCo

By Bill Bernico

Contrary to popular belief among music fans my age, rock and roll did not die out with the breakup f "The Beatles." There was, in my pinion, another super group waiting in the wings to fill their shoes. That group is "Chicago." Yes, that's right, the band that's around today playing those *MTV* hits is the same band who put out this tune back in 1969. Just goes to prove that if you're good, you'll last.

I used `DRAW`, `CIRCLE` and `PAINT` commands to create the familiar "Chicago" logo. You won't see any of this happen because the `SCREEN` command is put way down in Line 250 after all the drawing and painting is done. After the logo appears, you'll hear the tune "Colour My World" (yes, that's how they spell "color"). With each chord change, a letter of the title appears beneath the logo. The last letter meets the last note of the song in perfect timing.

After a short intermission, the whole process starts over. For you musicians, I've left `REM`ark statement lines before each `DATA` line so you can see which notes go into making up that particular chord. Come on, sing along! ☐

Bill Bernico is a self-taught computerist who enjoys golf, music and programming. He is a drummer with a rock band and lives in Sheboygan, Wis.)

180	110
300	141
550	84
END	122

The listing: `CHICAGO`

```
10 'CHICAGO LOGO & SONG
20 'BY BILL BERNICO
30 '708 MICHIGAN AVE.
40 'SHEBOYGAN, WI 53081
50 '(414) 459-7350
60 '
70 CLS:PRINT@136,"COLOUR MY WORL
D                    BY CHICAGO
80 PMODE4,1:PCLS5:COLOR0,1
90 DRAW"BM27,10R226D171L226U170R
225D169L224U169
100 CIRCLE(107,52),5,0,1,.12,.89
110 CIRCLE(80,70),45,0,1,.16,.71
120 CIRCLE(84,69),37,0,1,.16,.89
130 DRAW"BM111,50EU2HUHBM111,55R
EREUE2UEU2BH23BL15L3GL3GL2GLGBM1
05,99ERERER3ER3ER10FRFRFRF2RFD3G
DG2LG2L4HLHUR3ERU2H2LHL5GL2GL2GL
2GL2GL2G
140 CIRCLE(86,53),34,0,.93,.73,.
96
```

```
150 PAINT(107,55),0
160 CIRCLE(127,75),9,0,1,.10,.83
:CIRCLE(153,75),9:CIRCLE(183,75)
,9:CIRCLE(214,75),9
170 CIRCLE(127,75),13,0,1,.10,.8
3:CIRCLE(153,75),13:CIRCLE(183,7
5),13:CIRCLE(214,75),13
180 DRAW"BM103,82U18R6D18F2R2E2B
F2G3L5H2LG2L6H2BE22BR15BD2GDGDBD
11BR3EUEUEUEUEUED8GDGDGBR27BU3F2
R2E2BD4NE2G2L4H2BM103,82L4H3U13H
LHLHL7GLGLGU12ERERERER2ER2EUEU2E
U2H2LH2L5GLGLGLGLGLGDGD4L8GLGLGD
GD4FDF2FR2EUEUHUHU2R8D33R7U16ERE
RER4FDFDFD7FDFDFFRF
190 DRAW"BM87,45NE2GLGLGLGL2HU2E
RERERER2FRFDBR72BD18ND4RD5RU5RD5
RU5BR27ND4RD5RU5RD7RU7D31BD6D4GD
GLGLGLGGL33HLHUHU3EUEUERERERERER
ER28NU9BG5L22GLGLGLGD2F2R25ERERE
RU5L3BR9R30ERE2RE2RE2UE2UE2UE2UE
2U8H2UH2UH2UHLHLHLHL2HL9GLGLGDGD
BD30NL17R10ERE2RE2RE2UE2UE2
200 DRAW"U7H2UH2UHUHLHL2HL4GLG
210 PAINT(90,45),0
220 PAINT(155,100),0
230 PAINT(117,75),0:PAINT(143,75
),0:PAINT(173,75),0:PAINT(204,75
),0:PAINT(167,84),0
235 DRAW"BM235,107S4U6R3FDGL3RF3
":CIRCLE(236,104),7
240 '** DON'T SHOW SCREEN UNTIL
        LOGO IS DRAWN & PAINTED
250 SCREEN1,0
260 GOSUB 700:GOSUB 830
270 GOSUB 710:GOSUB 830
280 GOSUB 720:GOSUB 830
290 GOSUB 730:GOSUB 830
300 GOSUB 740:GOSUB 830
310 GOSUB 750:GOSUB 830
320 GOSUB 760:GOSUB 830
330 GOSUB 770:GOSUB 830
340 GOSUB 780:GOSUB 830
350 GOSUB 790:GOSUB 830
360 GOSUB 800:GOSUB 830
370 GOSUB 810:GOSUB 830
380 GOSUB 820
390 '*** FINAL NOTE (F)
400 SOUND 197,15
410 FOR X=1 TO 2000:NEXT X:RUN
420 '*** F major seventh
430 DATA 133,159,176,193,176,159
,133,159,176,193,176,159
440 '*** A minor
450 DATA 125,159,176,193,176,159
,125,159,176,193,176,159
460 '*** B flat
470 DATA 133,165,185,197,185,165
,133,165,185,197,185,165
480 '*** E flat major seventh
490 DATA 147,165,185,197,185,165
,147,165,185,197,185,165
500 '*** A flat major seventh
510 DATA 153,176,189,204,189,176
,153,176,189,204,189,176
520 '*** G flat major seventh
530 DATA 140,165,180,197,180,165
,140,165,180,197,180,165
540 '*** D ninth
550 DATA 140,159,176,193,176,159
,140,159,176,185,176,159
560 '*** G major seventh
570 DATA 147,170,185,200,185,170
,147,170,185,200,185,170
580 '*** E flat ninth
590 DATA 147,165,180,197,180,165
,147,165,180,197,180,165
600 '*** C seventh
610 DATA 147,165,176,193,176,165
,147,165,176,193,176,165
620 '*** C seventh
630 DATA 147,165,176,193,176,165
,147,165,176,193,176,165
640 '*** F major seventh
650 DATA 133,159,176,193,176,159
660 '*** B flat
670 DATA 133,165,185
680 '*** C
690 DATA 147,176,193
700 DRAW"BM44,130S8HL2GD4FR2EBD"
:RETURN ' C
710 DRAW"BR4HU4ER2FD4GNL2BR":RET
URN ' O
720 DRAW"BR3NU6R4":RETURN ' L
730 DRAW"BR4HU4ER2FD4GNL2BR":RET
URN ' O
740 DRAW"BR3BUNU5FR2ENU5BD":RETU
RN ' U
750 DRAW"BR3U6R3FDGL3RF3":RETURN
 ' R
760 DRAW"BR11U6F2DUE2D6":RETURN
' BLANK SPACE AND  M
770 DRAW"BR3BU6DF2E2NUG2D3BR2":R
ETURN ' Y
780 DRAW"BR11NU6E2NUF2NU6":RETUR
N ' BLANK SPACE AND  W
790 DRAW"BR4HU4ER2FD4GNL2BR":RET
URN ' O
800 DRAW"BR3U6R3FDGL3RF3":RETURN
 ' R
810 DRAW"BR3NU6R4":RETURN ' L
820 DRAW"BR3RU6NLR2FD4GNL2":RETU
RN ' D
830 FORX=1TO12:READA:SOUNDA,5:NE
XTX:RETURN ' PLAY THE NOTES THAT
              MAKE UP THAT CHORD
```

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are taking an interest
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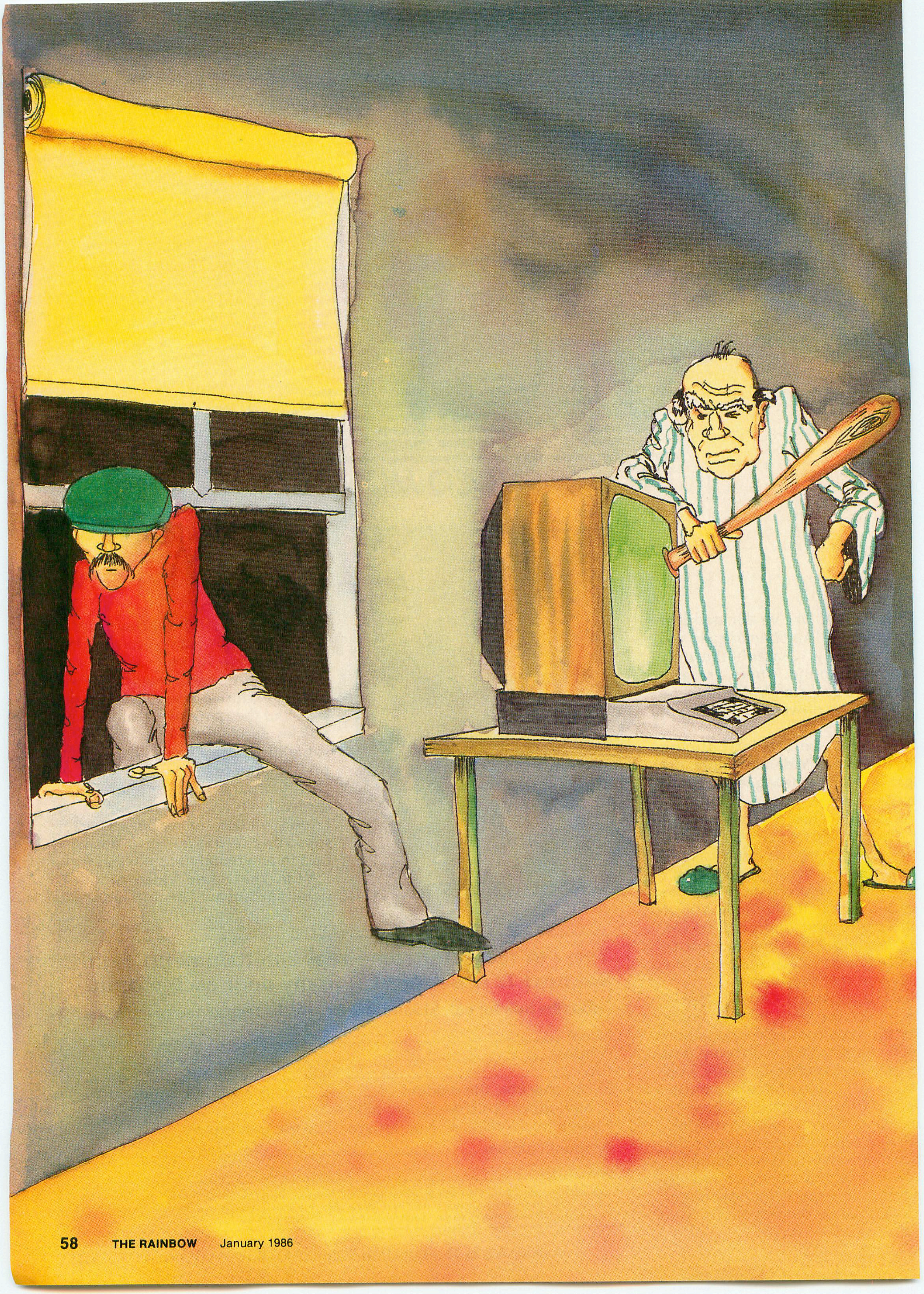

32K
Disk

SLEEP TIGHT

Your CoCo Is Awake Tonight

Part 2

This month, we'll finish up the alarm circuit by building a sophisticated local alarm system

By Dennis H. Weide

Last month, I showed you a simple alarm circuit that allowed scanning an alarm system in your house or apartment while you're away from home. This month, we'll use the same basic circuits to build a sophisticated local alarm system. This one has a hardware clock, an outside alarm bell and continuous alarm scanning. All alarms and activity are logged on disk. It's turned on and off at the front door via a key switch and has an LED indicator to show on/off status.

The Program

Listing 1 is the local alarm program. Six commands allow you to control all functions of the program. A menu is displayed when the program is first started and anytime the ENTER key is pressed. The prompt has been changed to "GO>" for easier recognition. Let's take a look at the commands.

Set Time

The correct time can be set with the SET TIME command. The clock should never vary more than a minute a day if built correctly. However, each time the alarm program is loaded and run, the clock must be set in software. Follow the prompts to set the time.

Alarm Log

All activity on the system is recorded on disk in the alarm log. The log is a direct access file, so the amount of disk space required is kept to a minimum. When the ALARM LOG command is entered, the program accesses the disk and prints all information in the log. All alarms (attempted break-ins) are printed on the screen along with the date and time the alarm is detected.

Print Log

The PRINT LOG command prints a hard copy that gives a permanent record of the log. You can use this record in the event of a break-in. It's a good idea to clear the log each time the program is started.

Clear Log

The CLEAR LOG command is used to erase the alarm log when you're sure it's no longer needed. The file is erased and a new one is created with the entry log cleared and the date and time.

Bell Off

The bell on the outside of the house alerts the neighborhood of an attempted break-in. When an alarm is tripped, the bell rings until shut off by the BELL OFF command. This command releases the cassette motor relay (the `MOTOR OFF` command) and silences the bell.

Sign Off

When you wish to stop program execution, use the SIGN OFF command. This stops the program and suspends the alarm system. If you wish to start the system again, type `CONT` and ENTER. The program jumps to start and you can set up the system again.

Command Entry

All commands are entered as a single number only. Enter the number next to the command to execute it. The program scans the clock and alarm circuits continuously, except when reading or writing to disk or executing a command. Now let's look at the hardware we'll be using.

(Dennis Weide is an avid computer hobbyist who teaches programming on the CoCo and IBM PC. He has written for all the major CoCo magazines, including many programs in RAINBOW. Dennis lives in Albuquerque, N.M.)

Table 1
Typical Circuit Values for Clock Circuit

Sec/Cycle	R1 Value	R2 Value	C2 Value
60	68K	4.3M	10 uF
30	27K	2.151M	10 uF
15	56K	1.56M	10 uF

Formulas

High output	Time 1=.693*(R1+R2)*C1
Low output	Time 2=.693*R2*C1
Total cycle time =	Time 1+time 2 in seconds

Table 2
Clock Circuit Parts List

Item	Price	Radio Shack No.
555 IC Timer	$1.19 ea.	276-1723
68K ohm Resistor	.39 pkg/5	271-1345
4.3M ohm Resistor (see text)		
10 Mfd. Elect. Capacitor	.59 ea.	272-1013
.01 Mfd. Capacitor	.59 pkg/2	272-1065
220 ohm Resistor (2 ea.)	.39 pkg/5	271-1313
TLR-107 Hi-Brite LED	.89 pkg/2	276-033

Table 3
Alarm Circuit Parts List

Item	Price	Radio Shack No.
N/C Window Switches	$ 3.49 ea.	49-495
N/O Tamper Switch	1.39 ea.	49-528
Door Lock Switch	9.95 ea.	49-511
N/C 120 ft. Foil	5.99 roll	49-502
N/C Foil Connectors	2.59 pkg/6	49-504
Joystick Plugs (2 ea.)	1.19 ea.	274-020
Cassette Plug (1 ea.)	1.49 ea.	274-003
33K ohm Resistors (3 ea.)	.39 pkg/5	271-1341
68K ohm Resistors (3 ea.)	.39 pkg/5	271-1345
100K ohm Resistors (3 ea.)	.39 pkg/5	271-1347
220 ohm Resistor (1 ea.)	.39 pkg/5	271-1313
TLR-107 Hi-Brite LED	.89 pkg/2	276-033
Hook-up and Alarm Wire	N/A	N/A
Alarm Bell	19.95 ea.	49-498

Table 4
Power Supply Parts List

Item	Price	Radio Shack No.
12.6V Mini Transformer	$3.59 ea.	273-1365
1000 uF Elect. Capacitor	1.59 ea.	272-1019
.01 uF Epoxy Capacitor	.59 pkg/2	272-1065
Full Wave Bridge Rectifier	.89 ea.	276-1161
7805 Fixed IC Regulator	1.59 ea.	276-1770
Sub-Mini SPST Toggle Switch	1.59 ea.	275-612
Fuse Holder	.99 ea.	270-367
Fuses	.69 pkg/3	270-1271
Project Box for Power Supply and Alarm Board	3.99 ea.	270-252

The Clock Circuit

Schematic 1 shows the hardwa clock circuit that provides the date an time for all disk writes. A 555 timer used to generate a square wave sign with a cycle time of one minute. Th cycle time requires the computer to sca the clock circuit only once every seconds to be accurate. To assure acc racy of the clock, use the compone values shown on the schematic. Eve time the clock output goes high, cloc memory is incremented. The output the clock is connected to Pin 1 of t right joystick (`JOYSTK(0)`). Cloc ground is connected to Pin 3 (groun of the same joystick.

Power for the clock is provided by t external +5 volt supply (Schematic which is also connected to the joysti ground. The LED and two 220 oh resistors (R3 and R4) provide a visu indication when the clock output go high (LED lighted). Use this indicat and resistor R2 when adjusting t timing of the circuit.

Resistors R1 and R2 and capacit C2 are used to determine the cycle tim The values shown generate a squa wave that is almost perfect. Table shows the cycle time and the resist and capacitor values required to achie them. R1 is a standard value resistor b R2 is not. I used four 1M ohm resisto in series with a 500K ohm pot to allo the cycle time to be adjustable.

For those who require perfection, y can add a 7473 chip (J-K Flip-Flop) the output to get a 50 percent duty cyc (a perfect square wave). The outp from the flip-flop will be one-half t clock cycle time. Therefore, you mu build the timer circuit to generate clock signal with a cycle time of seconds. Table 1 shows the formulas use to determine cycle time for the clo output. Table 2 is a parts list for t clock circuit.

The Clock Program

A machine language subroutine (Li ing 2) is used to read the hardwa clock. The program scans the clock `JOYSTK(0)` and the alarms on J STK(1) to `JOYSTK(3)`. The clock totally controlled by the machine la guage program while the alarm valu are passed to BASIC for computing t alarm conditions.

Lines 2100 to 4300 of the BAS program (Listing 1) contain the m chine language programs in BASIC DA

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Elite•File is the database manager that handles more total records, larger records, and manipulates data faster. Whether your data is inventory items or recipes, Elite•File is the correct choice. 32K req.

Elite•File (Disk only)—Radio Shack #90-0189	$74.50
Elite•File / PBJ* (Disk only) 80 column display	$79.95

*Requires PBJ Word Pak hardware

MasterCard VISA

Buy direct: Add $3.00 shipping
PA residents add 6% sales tax

Elite Software
NOW AT **Radio Shack** STORES
Available via Express Order
Radio Shack is a trademark of Tandy Corporation

Elite Software

201 Penn Center Blvd., Suite 301, • Pittsburgh, PA 15235 • (412)795-8492

NEW!

Elite•Home™

Elite•Home lets your Color Computer manage some very important household items. In creating Elite•Home, we selected the most requested home database applications, and custom designed Elite•Home to handle them. All of these custom applications are completely finished, fully detailed and READY TO USE. Just load-in YOUR data. One major advantage is that Elite•Home contains a modified version of our highly respected Elite•File program. Thi feature insures that you'll get fast and efficient processin of your information,without having to learn all the mess details about databases. Look at the applications below . . at less than $10 per application area, Elite•Home offers a exceptional user value.

- COLLECTIONS—Build a complete catalog of all your personal collections, like Stamps, Photos, Records, etc.
- IMPORTANT DATES—Quickly! What dates are coming up that are important to you? See, you need Elite•Home already to remember Birthdays, Anniversaries, Quarterly payments, etc.
- CREDIT CARD INVENTORY—If you lost your wallet/purse tomorrow, who would you contact, and with what information? Elite•Home would remember.
- HOME INVENTORY—In case of fire or theft, could you remember all details for lost items? Why not let your children catalog your possessions on Elite•Home. You gain protection, they gain computer database experience.

INTRODUCTORY PRICE
$49.95 Order Now! 32K, Disk Only
$59.95 After January 1, 1986

- MAILING LABELS—Stop hand addressing the same envelopes whe paying bills every month. Elite•Home is ready to do your mailing list for Clubs, Church, Leagues, and Bill paying.
- PHONE BOOK—OK, so we all keep a personal phone book . . whether it's in the kitchen drawer or our briefcase. If you used th Elite•Home phone book, you could ask for a display of all the car club phone numbers, do a search for the "contractor" that did tha work last year (what was his name anyway?), etc.
- CAR REPAIRS—When was the last time you changed oil in tha car(s) of yours? When is state inspection due? Let Elite•Home kee track of your service records, and inspection dates.
- CHECKS—At tax time, do you go back through your check book an total checks for donations? What about the total for medical ex penses? With data from your checks stored on Elite•Home, you ca quickly select any grouping of checks for a display and total.

Not available thru Radio Shack.

NEW!

Elite•Desk™

Elite•Desk brings a calculator, calendar, note pad, and ASCII table to your Color Computer. You can use Elite•Desk by itself, or have it run co-resident with any program in the Elite Software series. Imagine being able to "pull down" a calendar or calculator while typing text on Elite•Word, saving notes while using Elite•Calc, or "calling-up" an ASCII table while working on a Basic program. We've made Elite•Desk fully re-locatable so you can try with other programs as well. Whether you use Elite•Des by itself, or along-side another program, it's a valuab addition to your software library. Remember, if you've ev reached for a calculator, calendar, or note pad while usin your Color Computer . . . then you need Elite•Desk.

☑ CALCULATOR—Full featured, with all standard functions . . . plus 3 memories. Also works in HEX as an added feature for programmers.

☑ CALENDAR—Shows all days in any month. Lets you "scroll" through months and years with the arrow keys.

☑ ASCII TABLE—Full table displays all hex and ASCII values An excellent quick-reference tool.

☑ NOTE PAD—Write and save a full screen of text for late reference. Also includes directory and kill-file capability.

16K if used alone
64K with other programs

Buy direct: Add $3.00 shipping
PA residents add 6% sales tax

INTRODUCTORY PRICE
$39.95 Order NOW! Disk Onl
$49.95 After January 1, 198

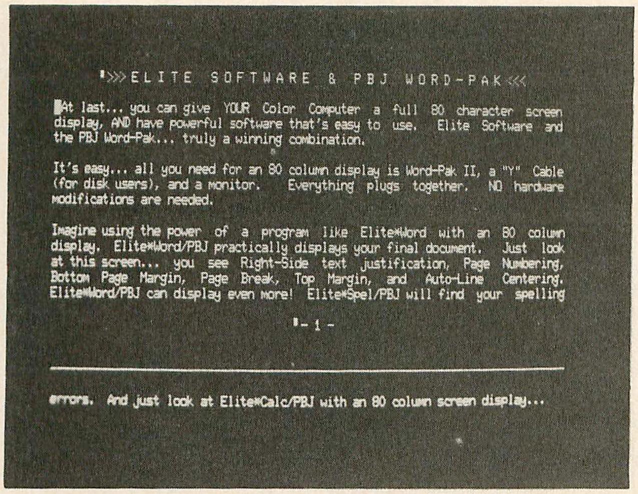
Not available thru Radio Shack.

Elite Software 201 Penn Center Blvd., Suite 301, • Pittsburgh, PA 15235 • (412)795-84

Move your CoCo into the "big leagues" with Elite Software and PBJ Word Pak II

FULL 80 COLUMN CAPABILITY

• No Tools—Everything plugs together



```
*>>>ELITE SOFTWARE & PBJ WORD-PAK<<<

At last... you can give YOUR Color Computer a full 80 character screen
display, AND have powerful software that's easy to use.  Elite Software and
the PBJ Word-Pak... truly a winning combination.

It's easy... all you need for an 80 column display is Word-Pak II, a "Y" Cable
(for disk users), and a monitor.   Everything plugs together.  NO hardware
modifications are needed.

Imagine using the power of a program like Elite*Word with an 80 column
display.  Elite*Word/PBJ practically displays your final document.  Just look
at this screen...  you see Right-Side text justification, Page Numbering,
Bottom Page Margin, Page Break, Top Margin, and Auto-Line Centering.
Elite*Word/PBJ can display even more!  Elite*Spel/PBJ will find your spelling

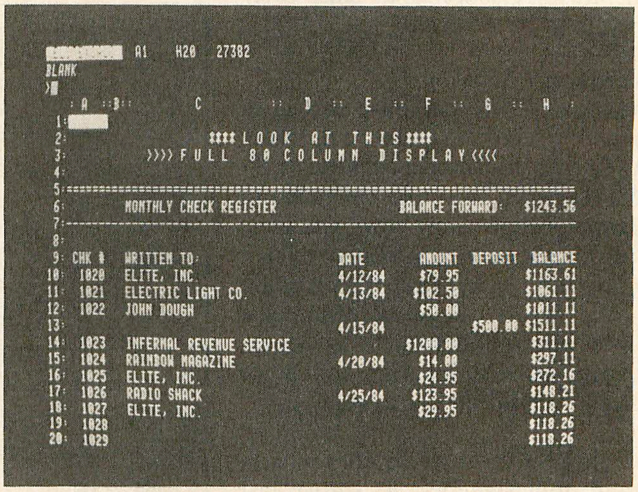
                                 *- 1 -

________________________________________________________________________________

errors.  And just look at Elite*Calc/PBJ with an 80 column screen display...
```

Elite•Word/PBJ* (Disk or Tape) 80 column display
$79.95

• No Hardware modifications



```
          A1   H20   27382
BLANK
>
  : A ::B::        C        ::  D  ::  E  ::  F  ::  G  ::  H  :
 1:
 2:                 ****L O O K  A T  T H I S****
 3:            >>>>F U L L  8 0  C O L U M N  D I S P L A Y<<<<
 4:
 5:==========================================================================
 6:        MONTHLY CHECK REGISTER                   BALANCE FORWARD:  $1243.56
 7:--------------------------------------------------------------------------
 8:
 9: CHK #  WRITTEN TO:                 DATE       AMOUNT  DEPOSIT  BALANCE
10:  1020  ELITE, INC.                 4/12/84    $79.95           $1163.61
11:  1021  ELECTRIC LIGHT CO.          4/13/84   $102.50           $1061.11
12:  1022  JOHN DOUGH                             $50.00           $1011.11
13:                                    4/15/84             $500.00 $1511.11
14:  1023  INFERNAL REVENUE SERVICE              $1200.00            $311.11
15:  1024  RAINBOW MAGAZINE            4/20/84    $14.00            $297.11
16:  1025  ELITE, INC.                            $24.95            $272.16
17:  1026  RADIO SHACK                 4/25/84   $123.95            $148.21
18:  1027  ELITE, INC.                            $29.95            $118.26
19:  1028                                                           $118.26
20:  1029                                                           $118.26
```

Elite•Calc/3.0/PBJ* (Disk only) 80 column display
$79.95

Elite•Spel/PBJ* (Disk only) 80 column display **$49.95.** Only $20.00 when purchased with Elite•Word/PBJ. Elite•File/PBJ* (Disk only) 80 column display **$79.95.** Elite•Comm/PBJ* (Tape or Disk) 80 column display **$49.95.**

Hardware required:
WORD-PAK II
Our Price $125.00
$3.00 Shipping/Handling
"Y" Cable Connector **$25.00**

Disk Manager/PBJ . . . Lets you move files from one disk to another. Also, purge files or move them to tape. Works with one or more disk drives. **List $39.95.**

Not available thru Radio Shack.

NEW!

CoCo-LISP

READY NOW! An excellent implementation of the famous LISP language, now available for the Color Computer. Now you can have the language that has been gaining much attention in the field of artificial intelligence and other applications. CoCo-LISP supports all the LISP primitives, ncluding data structure (LISTs), recursive functions, and garbage-collection. CoCo-LISP has over 70 built-in functions, super performance, and a high-res, full-screen editor for program development. If you already know the LISP language, and have been waiting for a Color Computer version, CoCo-LISP is for you. 64K, RSDOS required.

- **Use functions as data for other functions**
- **Permits functions to be called recursively**
- **Add your own functions; use as if built-in**
- **Write self-modifying programs**
- **Over 70 built-in functions**
- **Supports all LISP primitives**
- **High-res screen with true upper/lower case display**
- **Full screen editor for program development**
- **Full disk access and printer supported**

INTRODUCTORY PRICE
$69.95 Order NOW! 64K Disk only.
$89.95 After January 1, 1986

Not available thru Radio Shack.

Elite Software 201 Penn Center Blvd., Suite 301, • Pittsburgh, PA 15235 • (412)795-8492 statements. There is no need to enter the assembly language listing.

If you want to use the clock and program in other applications, execute Hex address 7100 to initialize the clock and Hex address 7129 every time you wish to scan the clock. You can build your own timer for any cycle time desired. Just remember that the clock circuit must be scanned at least twice each cycle to be accurate.

Local Alarm Loops

The local alarm loops are shown in Schematic 2. They're similar to the basic circuit shown last month. Switches S1 and S2 represent the on/off switch and the tamper switch. They work the same way as the remote alarm system except relays are not needed since the program scans the alarm circuit continuously. When an alarm is detected, the condition is registered in memory so it's not necessary to hold an alarm relay operated.

Switches S3 through S6 are the window and door switches. As shown last month, they are a series of switches — one for each door and window on the specified side of the house. They should be closed when the door or window is closed. The schematic also shows the joystick assignments for the four sides of the house. Table 3 is a parts list for the local alarm.

External Power Supply

Last month, I showed the schematic of an external power supply used to prevent loading of the CoCo power supply. I have included the schematic again for reference (Schematic 3) and a parts list (Table 4). Be sure to ground the power supply to Pin 3 of either joystick port. Failure to do so could end in disaster. For an explanation of the power supply, see last month's edition of RAINBOW (Page 58).

The Alarm Bell Circuit

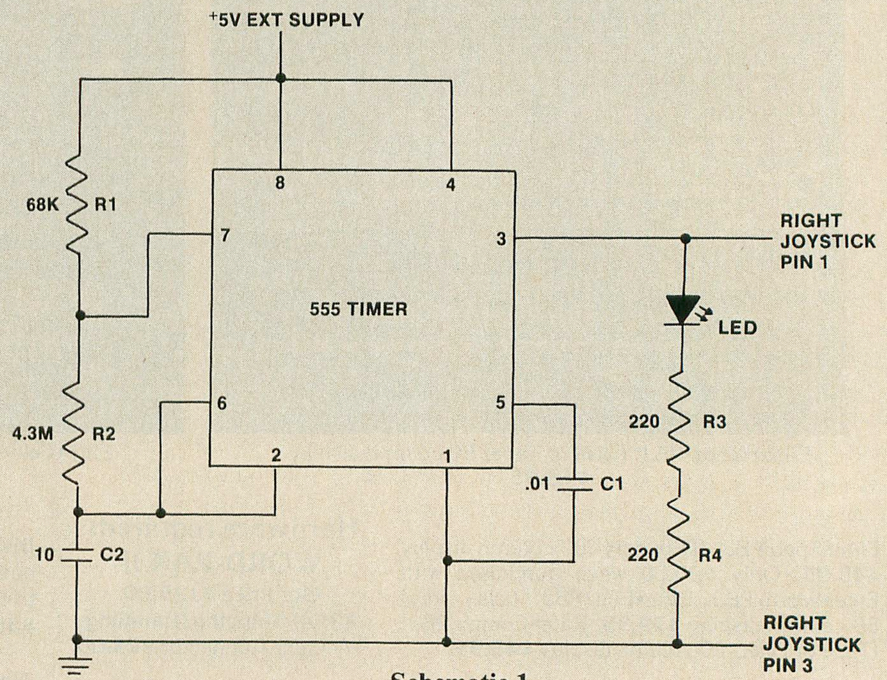
This alarm has another feature not used in last month's project. An alarm bell is located outside the house in an inaccessible place. When an alarm is activated, the bell rings.

Connection to the computer is made via the cassette jack on the back of the computer. This is the cassette motor relay, which is operated and released by the `MOTOR ON` and `MOTOR OFF` commands. The BELL OFF command silences the bell.

The circuit is simple. I use a car battery (60 amp-hours), which can ring the bell for several days if necessary. You must charge the battery at regular intervals, but be careful not to overcharge it. Those experienced in electronics can build a small charging circuit to provide a continuous charge. Place the battery in a plastic battery box and coat all connections with clear Karo syrup to prevent corrosion. The syrup will harden and, when necessary, can b removed with warm water. It's an excellent anti-corrosive.

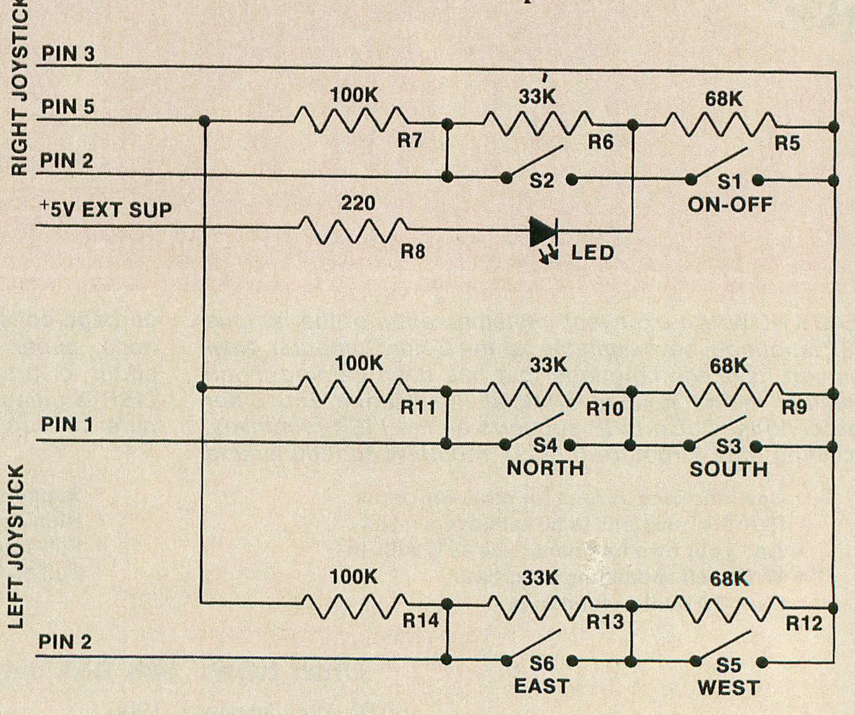
I used two standard Radio Shac alarm bells that draw ½ amp each at 1 volts. Locate your bells where they ar inaccessible so they can't be tampere with.

Clock Circuit



Schematic 1

Local Alarm Loops



Schematic 2

Escape: 2012

by BJ Chambless

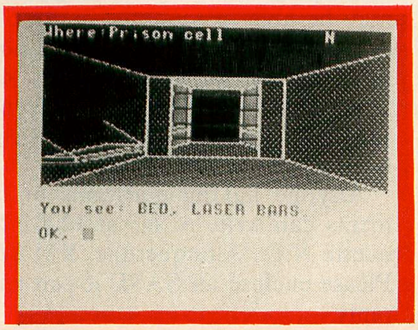
SCENARIO: You are on an alien prison ship behind the enemy lines, captured while on a recon mission for the United Earth Forces.

OBJECT: The same for any prisoner of war—to escape and return back to your side!

SETTING: In the year 2009 the Earth solar system was attacked by hostile forces from another solar system. The battle has raged for 3 years. Even with faster-than-light star ships and planet-covering force fields, the war remains a stalemate. Both sides use their spies, scouts, and ultimate weapons to gain an edge, but, as in any war, the turning point can be the actions of a few or even one person!

In this graphics adventure there are over 35 objects to deal with, 137 rooms arranged in a 3 dimensional maze of 4 levels to traverse, and at least 2 arcade sequences to master before you can proceed. The graphics and action are superb!

Requires 64K **Cassette $24.95** **Disk $27.95**



```
Where:Prison cell                N

You see: BED, LASER BARS
OK.
```

Treasure of the Aztecs

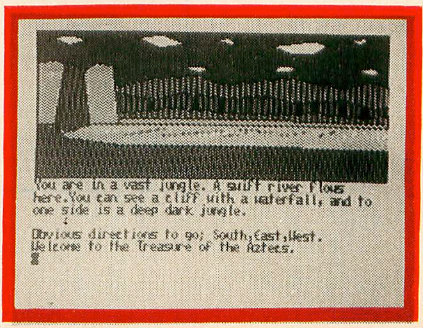
by John Sandberg

The year is 1520. After taking the emperor Montezuma hostage, Hernando Cortes storms Mexico City. Cortes conquers the Aztecs, but when the Spaniards search the fallen city the great Treasure of the Aztecs cannot be found!

As a greedy Spanish soldier under the Cortes, you take a small force to search the jungles in hopes of finding the missing treasure. While following a faint trail, your team is ambushed by Aztec warriors. Knocked unconscious during the battle, you awaken alone and disoriented. You must assume your men are dead and now face the relentless jungle alone; but your greed won't let you forget the Treasure of the Aztecs! Can you, a lone soldier, survive the perils of the jungle... and recover the great Treasure of the Aztecs?

Treasure of the Aztecs is unique, featuring special sound effect and four voice music, over 50 *hires* graphic screens, input with arrow keys or joystick, and allows use of the Radio Shack SSC Speech Cartridge!

Requires 64K **Cass $24.95** **Disk $27.95**



```
You are in a vast jungle. A swift river flows
here.You can see a cliff with a waterfall, and to
one side is a deep dark jungle.

Obvious directions to go: South,East,West.
Welcome to the Treasure of the Aztecs.
```

To Order:
Add $2 shipping.

COMPUTERWARE®
Box 668 •
Encinitas, CA 92024
(619) 436-3512

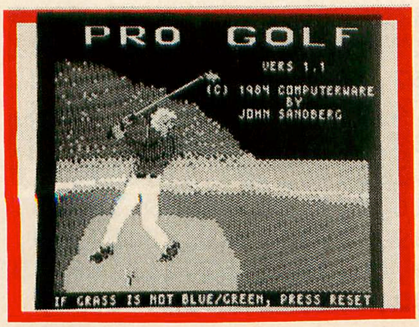
Pro Golf

by John Sandberg

Are you ready to tee off into a challenging computer simulation of America's most played sport? WARNING!!! This is NOT a game, but a simulation that will make you work for your score! It offers practice sessions with the Putting Practice and Driving Range options. Then you must tee off to play either the front nine or back nine. You will face real situations with wind factor, lies in the rough or out-of-bounds, careful club choice decisions, coordination problems, trees and water and traps, and more! But do not despair, with practice you can certainly improve your score.

Pro Golf provides an entertaining challenge to the beginner and the pro with 2 disks with a total of 36 holes to practice on!

Requires 32K Disk & Extended Basic **$29.95**



```
PRO GOLF
VERS 1.1
(C) 1984 COMPUTERWARE
BY
JOHN SANDBERG

IF GRASS IS NOT BLUE/GREEN, PRESS RESET
```

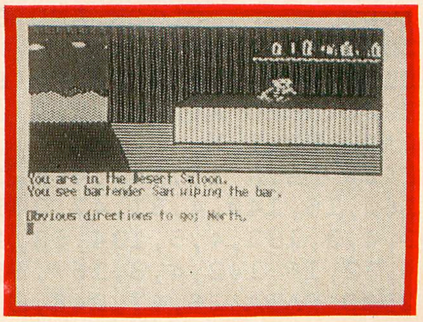
OMNIVERSE

by Scott Cabit

During your research as a theoretical physicist, you discover a way to warp space and time, allowing you to pass from one dimension to another. By using these "gateways" you can go anywhere in the multidimensional universe! But during your travels through time and space, you uncover an alien plot to take over the entire omniverse by controlling networks of these gateways! You must be careful, but since you are the only person on Earth who knows about the gateways, you must find a way to save Earth! It isn't easy passing through the different dimensions—and you don't know when you may pass through an alien gateway!

Enjoy the graphics of the many different time periods and the suspense of this complex challenge! If you have the Radio Shack Speech and Sound Cartridge, it will even speak every word displayed!

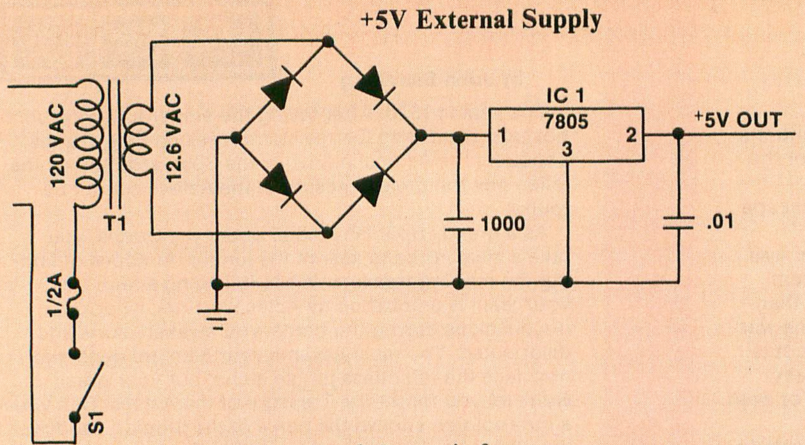
Requires 64K **Cass $24.95** **Disk $27.95**



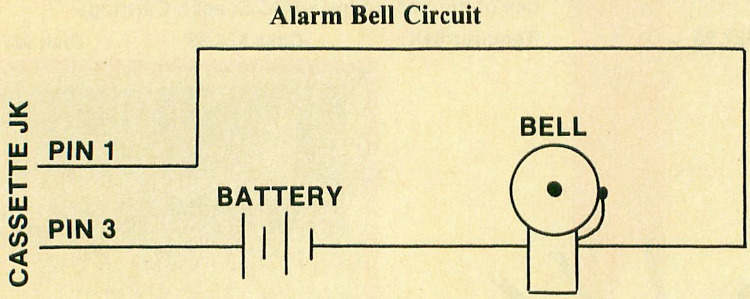
```
You are in the Desert Saloon.
You see bartender Sam wiping the bar.

Obvious directions to go: North.
```

Call or write
for our FREE catalog!



Schematic 3



Schematic 4

The Heat Is On

Those who are worried about th CoCo overheating can purchase one c several fan attachments to keep it coo However, if you leave the computer o for several hours with no ill effects, yo probably don't have anything to worr about. I've had two CoCos and severa other computers, and they all ran fc over 16 hours a day for weeks on enc As long as the computer is properl ventilated, overheating shouldn't be problem.

A Few More Notes

This alarm system was built first an later modified to provide the one show last month. No matter which one yo choose, the feeling of security you'll ge is well worth the effort.

A parts list is included for each phas of the project (Tables 1 through 4). Yo may be able to scavenge many of th parts or order them from parts house for less. You can also wait until Radi Shack puts the parts that are needed o sale. That's what I did and I saved bundle.

Anyone having questions or com ments can write to me at 14201 Ma quette N.E., Albuquerque, NM 8712 Please enclose an SASE if you wish reply.

2700	160	11400	255
3900	194	13700	73
5700	35	16400	15
7700	89	END	24
9300	55		

Listing 1: `LCLALARM`

```
1000 '      LOCAL BURGLAR ALARM
1100 '      BY DENNIS H. WEIDE
1200 '      14201 MARQUETTE N.E.
1300 '      ALBUQUERQUE,NM  87123
1400 '      (C) 1985
1500 '
1600 CLS:DEFUSR1=&H7129:DEFUSR2=
&H7100
1700 CLEAR 2000,&H7000
1800 '
1900 '      CLOCK AND CALENDAR
2000 '
2100 FOR X=&H7100 TO &H7247
2200 READ A:POKE X,A
2300 NEXT X
2400 DATA 16,142,4,0,134,48,167,
160,16,140,4,31,47,246,134,47,18
3,4,2,183,4,5,134,58,183,4,29,13
4,32,16,142,4,8,167,160,16,140,4
2500 DATA 26,47,248,189,169,222,
182,1,90,177,112,255,39,2,32,1,5
7,183,112,255,129,40,46,1,57,182
,4,31,76,129,58,39,4,183,4,31,57
2600 DATA 134,48,183,4,31,182,4,
30,76,129,54,39,4,183,4,30,57,13
4,48,183,4,30,182,4,28,76,129,52
,39,21,129,58,39,4,183,4,28,57,1
34
2700 DATA 48,183,4,28,182,4,27,7
6,183,4,27,57,246,4,27,193,50,39
,2,32,226,16,142,4,27,142,48,48,
191,4,27,191,4,30,182,4,4,76,183
2800 DATA 4,4,190,4,0,140,49,50,
39,2,32,28,16,190,4,3,16,140,51,
50,39,2,32,16,142,48,49,191,4,0,
191,4,3,182,4,7,76,183,4,7,190,4
2900 DATA 3,140,50,57,39,22,140,
51,49,39,12,140,51,50,39,2,32,13
,189,114,43,32,8,189,114,14,32,3
,189,113,247,182,4,4,129,58,39,1
3000 DATA 57,134,48,183,4,4,182,
4,3,76,183,4,3,57,16,190,4,0,16,
140,48,50,39,1,57,142,48,49,191,
4,3,134,51,183,4,1,57,16,190,4,0
3100 DATA 16,140,48,52,39,19,16,
140,48,54,39,13,16,140,48,57,39,
7,16,140,49,49,39,1,57,142,48,49
,191,4,3,182,4,1,76,183,4,1,190
```

Computerware®'s Quality Hardware

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Monitors

NAP Monochrome Monitors

The 20 mhz band width, 800 line resolution, and 80x25 display insure a crisp picture. The non-glare screen and streamlined style is also attractive. Plus—it has audio input!

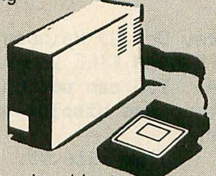
Green 12" Amber 12"	**$109.95**

plus $10 shipping

NAP Color Monitor

Resolution of this 13" color monitor is 350 lines x 350 lines, giving an excellent display. It includes composite video color and audio.

$249.95 plus $15 shipping



Disk Systems

Includes controller, DOS manual, cabinet, power supply, half-size double density drive, and all cables. Please specify RSDOS or JDOS. Add $10 for the new J & M switchable controller with printer port and JDOS. For both operating systems, add $25 for the HDS switchable controller or add $40 for the dual DOS J & M switchable controller with printer port.

Single drive, Single sided	**$279.00**
Single drive, Double sided	**$309.00**
Dual drives, Single sided	**$389.00**
Dual drives, Double sided	**$439.00**

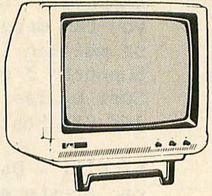
Adding On

Each includes half-sized drive in cabinet with extender.

Single drive, Single sided	**$169.00**
Single drive, Double sided	**$199.00**

Controllers

J&M controller w/JDOS or RSDOS	**$127.95**
HDS controller w/RSDOS or JDOS	**$127.95**
J & M controller w/JDOS & printer port	**$137.95**
HDS controller w/RSDOS & JDOS	**$154.95**
J & M switchable controller w/JDOS & RSDOS and printer port	**$169.95**



Put a Monitor on Your CoCo with The New Universal Video Plus

We would like you to look at our old Video Plus IIU with new eyes. We now call it the **Universal Video Plus** & would dare you to compare it with any other video interface. We feel confident that you will see that it is the **best product** & the **best buy** in CoCo monitor drivers ever!

Sure, at first glance you will notice that it costs a little more. But look further & see how much more you get! The bottom line is that the **Universal Video Plus** is the **best bargain** available. Here are the important features to consider & compare.

- The Universal Video Plus works with **every CoCo** made Easy-to-follow, **clear instructions** are included for every model.
- **All cables** (audio & video) are included. There is no need to buy extenders or extra cables as required by other drivers. With this consideration, the Universal Video Plus is now the most cost effective video interface of all.
- **Heavy duty construction**, evidenced by sturdy leads & connectors, allows the necessary handling for installation without fear of breakage.
- **Shielded audio & video cables** insure that no extra RF interference will be introduced from the Universal Video Plus, unlike other interfaces.
- The **adjustment** pot on the Universal Video Plus makes it **easy to optimize** the video signal for each computer. You don't have to modify your computer to get good display!
- Our advanced design gives the **highest quality display**—better than any other device offered!
- **Installation is easy.** There is no soldering & no dismantling of the RF shield.
- Thousands of Universal Video Plus' are in use throughout the U.S. Clearly the test of time has **proven** its reliability.
- The Universal Video Plus is backed by the **Computerware** reputation for excellence & service.

Universal Video Plus	**$34.95**

also available. . . while supplies last. . .

Video Plus I **$24.95**
Interfaces the original model of Color Computer to any composite video monitor (color or monochrome)

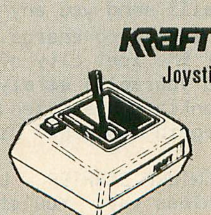
Video Plus IIC **$34.95**
Interfaces the Color Computer II (model 26-3026) with either a color or monochrome composite video monitor. Computer must have video chip in socket.

Supplies

Rainbow Diskettes collection of 5 bright colors	5 pak	**$10.95**
	10 pak	**$19.95**
Black Diskettes	5 pak	**$ 8.95**
	10 pak	**$16.95**
6 Outlet Surge Protector		**$19.95**

Protect your investment and organize all those cords with this handy power strip. The surge protector filters power spikes from damaging your valuable equipment. Reg. $24.95

KRAFT Joystick



$24.95

Video Clear from Computer Assoc. **$16.95**
Connects between the computer & TV to reduce interference from the computer.

WICO Joystick Adapter **$14.95**

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2% for orders over $100
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```
3200 DATA 4,0,140,48,58,39,1,57,
142,49,48,191,4,0,57
3300 EXEC &H7100
3400 FOR X=&H420 TO &H43F
3500 READ A:POKE X,A
3600 NEXT X
3700 DATA 32,32,32,32,32,32,32,3
2,32,32,2,21,18,7,12,1,18,32,1,1
2,1,18,13,32,32,32,32,32,32,32,3
2,32
3800 FOR X=&H7000 TO &H7049
3900 READ A:POKE X,A
4000 NEXT X
4100 EXEC &H7000
4200 DATA 190,1,104,175,140,12,4
8,140,12,191,1,104,134,57,167,14
0,239,57,85,85,2,52,23,13,111,38
,16,158,136,140,5,224,45,9,129,1
3
4300 DATA 39,11,140,5,255,39,6,5
3,23,110,157,255,225,166,140,224
,198,32,61,195,4,0,48,140,9,52,1
6,31,1,52,22,126,163,78,10,137,3
2,225
4400 '
4500 '     READ ALARM CONFIG
4600 '
4700 FOR X=4 TO 9
4800 READ AM$(X)
4900 NEXT X
5000 DATA NORTH SIDE ALARM,SOUTH
 SIDE ALARM,NORTH/SOUTH ALARM
5100 DATA EAST SIDE ALARM,WEST S
IDE ALARM,EAST/WEST ALARM
5200 DIM DR$(68)
5300 GOTO 9000
5400 '
5500 '
5600 '
5700 '      CLOCK UPDATE
5800 '
5900 D=USR1(0)
6000 '
6100 '      START OF ALARM SCAN
6200 '
6300 FOR X=1 TO 3
6400 A(X)=PEEK(&H15A+X)
6500 NEXT X:Y=4
6600 '
6700 '      COMPUTE ALARM VALUE
6800 '
6900 IF A(1)>39 AND F3=0 THEN RE
TURN
7000 IF A(1)>39 AND F3=1 THEN AR
$="ALARM DEACTIVATED":GOSUB 1490
0:F3=0
7100 IF A(1)>9 AND A(1)<15 AND F
3=0 THEN AR$="ALARM ACTIVATED":G
OSUB 14900:F3=1
```

```
7200 IF A(1)=0 AND T1=0 THEN AR$
="TAMPER ALARM":GOSUB 14900:T1=1
:AR$="BELL ON":GOSUB 14900:MOTOR
 ON
7300 IF A(1)>9 AND A(1)<15 AND T
1=1 THEN AR$="TAMPER CLEAR":GOSU
B 14900:T1=0
7400 FOR X=2 TO 3
7500 IF A(X)=0 THEN AF(Y)=0:AF(Y
+1)=0:AF(Y+2)=0:FF=FF+1:GOTO 790
0
7600 IF A(X)>9 AND A(X)<15 AND A
F(Y)=0 THEN AR$=AM$(Y):GOSUB 149
00:AF(Y)=1:F1=1:GOTO 7900
7700 IF A(X)>20 AND A(X)<28 AND
AF(Y+1)=0 THEN AR$=AM$(Y+1):GOSU
B 14900:AF(Y+1)=1:F1=1:GOTO 7900
7800 IF A(X)>28 AND AF(Y+2)=0 TH
EN AR$=AM$(Y+2):GOSUB 14900:AF(Y
+2)=1:F1=1
7900 Y=Y+3:NEXT X
8000 IF F1=1 AND F2=0 THEN MOTOR
 ON:F2=1:AR$="BELL ON":GOSUB 149
00
8100 IF F1=1 AND FF=2 THEN AR$="
ALARM CLEARED":F2=0::GOSUB 14900
:F1=0
8200 FF=0
```

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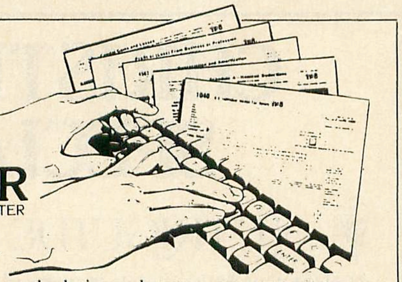
```
8300 RETURN
8400 '
8500 '     PASSWORD AND COMMANDS
8600 '
8700 '
8800 '     SET CLOCK
8900 '
9000 D=USR2(0):PRINT@480
9100 INPUT"ENTER TIME (HHMM)";A$
9200 INPUT"ENTER DATE (MMDDYY)";
B$
9300 POKE &H41F,VAL(MID$(A$,4,1)
)+48
9400 POKE&H41E,VAL(MID$(A$,3,1))
+48
9500 POKE&H41C,VAL(MID$(A$,2,1))
+48
9600 POKE&H41B,VAL(MID$(A$,1,1))
+48
9700 POKE&H0400,VAL(MID$(B$,1,1)
)+48
9800 POKE&H0401,VAL(MID$(B$,2,1)
)+48
9900 POKE&H0403,VAL(MID$(B$,3,1)
)+48
10000 POKE&H0404,VAL(MID$(B$,4,1
))+48
10100 POKE&H0406,VAL(MID$(B$,5,1
))+48
10200 POKE&H0407,VAL(MID$(B$,6,1
))+48
10300 PRINT
10400 AR$="SET CLOCK":GOSUB 1490
0
10500 GOTO 12000
10600 '
10700 '      COMMAND MODULE
10800 '
10900 CM$="":PRINTTAB(10)"PROGRA
M MENU"
11000 PRINTTAB(10)"------------"
11100 PRINT
11200 PRINTTAB(10)"1. SET TIME"
11300 PRINTTAB(10)"2. ALARM LOG"
11400 PRINTTAB(10)"3. PRINT LOG"
11500 PRINTTAB(10)"4. CLEAR LOG"
11600 PRINTTAB(10)"5. BELL OFF"
11700 PRINTTAB(10)"6. SIGN OFF"
11800 PRINT:PRINT
11900 PRINT"GO >"
12000 CM$=INKEY$
12100 GOSUB 5900
12200 IF CM$="" THEN 12000
12300 IF CM$=CHR$(13) THEN PRINT
:GOTO 10900
12400 CM=VAL(CM$):IF CM=3 THEN P
N=-2 ELSE PN=0
12500 IF CM>0 AND CM<7 THEN 1330
0
12600 CM$=""
12700 PRINT"INVALID COMMAND"
12800 GOTO 12000
12900 '
13000 '      START PROGRAM HERE
13100 '      USE "ON CM GOSUB"
13200 '
13300 ON CM GOSUB 9000,16000,160
00,20100,19400,17900
13400 IF F5=1 THEN F5=0:GOTO 109
00
13500 GOTO 12000
13600 '
13700 '      READ AND WRITE ALARM
S TO DISK
13800 '
13900 '
14000 '
14100 '      OPEN BUF #1
14200 '
14300 OPEN"D",#1,"ALARM.DAT",40
14400 FIELD#1,18 AS AL$,22 AS TI
$
14500 RETURN
14600 '
14700 '      WRITE ALARMS TO DISK
14800 '
14900 PRINT:PRINTTAB(6)"*****ALA
```



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City ____________ State ____ Zip ____
Signature ____________
I need the built-in sales tax table for ____________ (state).
Mass. residents add 5% sales tax. Shipped post paid. Allow two weeks for delivery.

```
RM ENTRY*****":GOSUB 18300:PRINT
TAB(6) CL$:PRINTTAB(8) AR$
15000 GOSUB 14300
15100 LSET AL$=AR$
15200 LSET TI$=CL$
15300 PUT#1,LOF(1)+1
15400 CLOSE#1
15500 PRINT:PRINT"GO >"
15600 RETURN
15700 '
15800 '     READ ALARMS FROM DIS
K
15900 '
16000 GOSUB 14300
16100 PRINT#PN,STRING$(32,"-")
16200 FOR X=1 TO LOF(1)
16300 GET#1,X
16400 FOR ZZ=1 TO 500:NEXT ZZ
16500 PRINT#PN
16600 PRINT#PN,TAB(6)"******LOG
ENTRY******"
16700 D=USR1(0)
16800 PRINT#PN,TAB(6) TI$
16900 D=USR1(0)
17000 PRINT#PN,TAB((32-LEN(AL$))
/2) AL$
17100 D=USR1(0)
17200 NEXT X
17300 CLOSE#1
17400 PRINT:PRINT"GO >"
17500 RETURN
17600 '
17700 '      END PGM
17800 '
17900 STOP:RETURN
18000 '
18100 '      READ TIME
18200 '
18300 CL$=""
18400 FOR X=&H400 TO &H40F
18500 CL$=CL$+CHR$(PEEK(X))
18600 NEXT X
18700 FOR X=&H41B TO &H41F
18800 CL$=CL$+CHR$(PEEK(X))
18900 NEXT X
19000 RETURN
19100 '
19200 '      SILENCE ALARM
19300 '
19400 MOTOR OFF
19500 AR$="BELL OFF"
19600 GOSUB 14900
19700 RETURN
19800 '
19900 '      CLEAR LOG
20000 '
```

SUPPORT:

(sə·pôrt) v.t. **1**. To bear the weight of, especially from underneath; uphold in position; keep from failing, etc. **2**. To bear or sustain (weight; etc.) **3**. To keep from failing; strengthen: *PBJ, Inc. supports their product line with technical personnel that are always there to help you.* **4**. To serve, to uphold or corroborate (a statement, theory, etc.) substantiate; verify: *PBJ, Inc. receives testimonials on a daily basis that support their product line.* **5.** To provide (a person, institution) with maintenance; provide for: *PBJ, Inc. supports the CoCo user by consistently creating new advancements in their field.*

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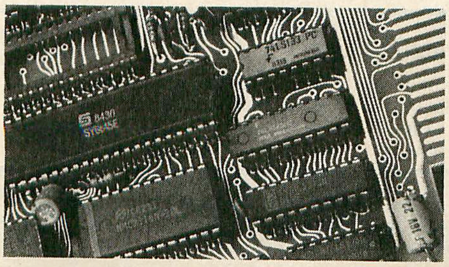
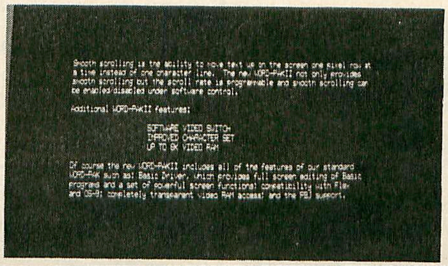
* Derived from *Funk & Wagnall's International Dictionary*





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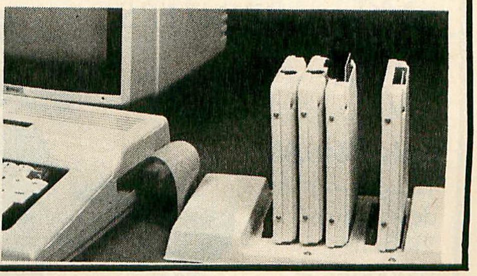

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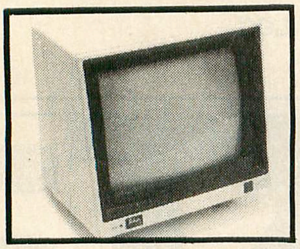

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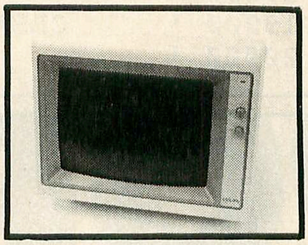

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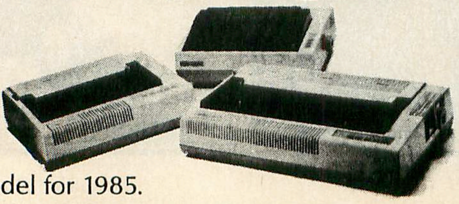

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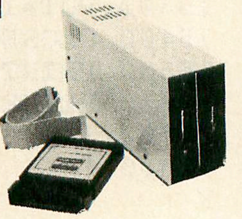

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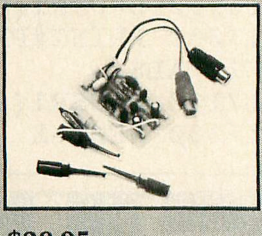

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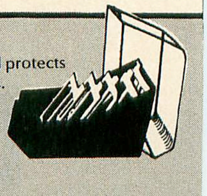

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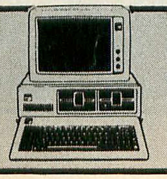

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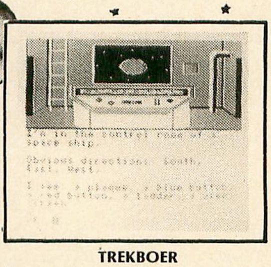

```
I'm in the control room of a
space ship.

Obvious directions: South,
East, West.
```

TREKBOER

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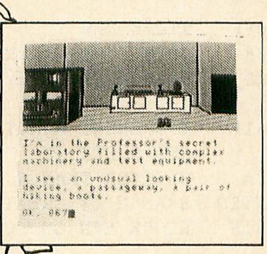


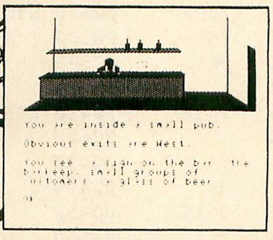
```
I'm in the Professor's secret
laboratory filled with complex
machinery and test equipment.

I see: an unusual looking
device, a passageway, a pair of
hiking boots.

OK, 067
```

CALIXTO ISLAND

A valuable museum treasure has been stolen; can you recover it??? This is a challenging **adventure** with an occasional twist of humor. You'll visit a secret laboratory, a Mayan pyramid, and you'll meet crazy Trader Jack—all in living color and exciting detail.



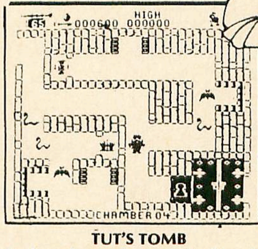
```
You are inside a small pub.

Obvious exits are West.

You see: a sign on the bar, the
barkeep, small groups of
customers, a glass of beer
```

SHENANIGANS

Countless legends tell of a magnificent pot of gold hidden at the end of the rainbow. Many have attempted to find the marvelous treasure but success has eluded them and it remains hidden to this day. You, as a dedicated **adventurer**, have determined to search for the fabled riches.



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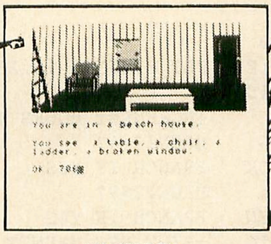
Explore the ancient, mystical tomb of the great Pharoah. Find the magical keys which lead you to unbelievable treasures as you outmaneuver the creatures that slither and swarm about you. Super fast **arcade** action—this one will knock your socks off.



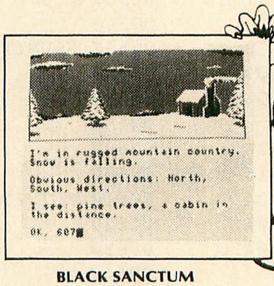
```
You are in a beach house.

You see: a table, a chair, a
ladder, a broken window.

OK, 708
```

SEA SEARCH

Get your shark repellant and scuba tanks ready! The graphics in this **adventure** are truly outstanding and the underwater scenes are unforgettable. You'll run into a pirate, a mermaid and some hungry sharks in this coloful and unique treasure hunt.



```
I'm in rugged mountain country.
Snow is falling.

Obvious directions: North,
South, West.

I see: pine trees, a cabin in
the distance.

OK, 607
```

BLACK SANCTUM

Encounter the forces of black magic as you roam around an 18th century monastery. You'll see all the evil locations in this spooky **adventure**; you'll love searching for and destroying evil in this classic tale. A MUST for every adventure game fan!

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```
20100 PRINT:PRINT"ARE YOU SURE (
Y/N)"
20200 IP$=INKEY$:GOSUB 5900
20300 IF IP$="" THEN 20200
20400 IF IP$<>"Y" THEN PRINT:PRI
NT"GO >":RETURN
20500 KILL"ALARM.DAT":AR$="LOG C
LEARED":GOTO 14900
```

Listing 2: CALCLOCK

```
                    00100 *      CLOCK & CALENDAR PROGRAM
                    00110 *      BY DENNIS H. WEIDE
                    00120 *      14201 MARQUETTE N.E.
                    00130 *      ALBUQUERQUE,NM 87123
                    00140 *      (C) 1985
7100                00150        ORG     $7100
7100 108E 0400      00160 START  LDY     #$0400   START OF SCREEN
7104 86   30        00170 ZEROS  LDA     #$30     LOAD SCREEN
7106 A7   A0        00180        STA     ,Y+      WITH ZEROS
7108 108C 041F      00190        CMPY    #$041F   END OF SCREEN?
710C 2F   F6        00200        BLE     ZEROS
710E 86   2F        00210        LDA     #$2F     PRINT SLASHES
7110 B7   0402      00220        STA     $0402
7113 B7   0405      00230        STA     $0405
7116 86   3A        00240        LDA     #$3A     PRINT COLON
7118 B7   041D      00250        STA     $041D
711B 86   20        00260        LDA     #$20     LOAD BLANK SPACE
711D 108E 0408      00270        LDY     #$0408   START OF SCREEN BLANKS
7121 A7   A0        00280 BLANKS STA     ,Y+      BLANK OUT SCREEN
7123 108C 041A      00290        CMPY    #$041A
7127 2F   F8        00300        BLE     BLANKS
7129 BD   A9DE      00310 JOYSTK JSR     $A9DE    READ JOYSTKS
712C B6   015A      00320        LDA     $015A    COMPARE JOYSYK(0)
712F B1   70FF      00330        CMPA    $70FF    WITH LAST READING
7132 27   02        00340        BEQ     RET      RETURN IF EQUAL
7134 20   01        00350        BRA     STORE    IF NOT EQUAL
7136 39             00360 RET    RTS
7137 B7   70FF      00370 STORE  STA     $70FF    STORE NEW
713A 81   28        00380        CMPA    #$28     JOYSTK(0) VALUE
713C 2E   01        00390        BGT     LOAD     BRANCH IF HIGH
713E 39             00400        RTS
713F B6   041F      00410 LOAD   LDA     $041F    INCREMENT MINUTE
7142 4C             00420        INCA             AND CHECK IF
7143 81   3A        00430        CMPA    #$3A     GREATER THAN 9
7145 27   04        00440        BEQ     MINTEN   BRANCH IF GREATER
7147 B7   041F      00450        STA     $041F    STORE MIN ON SCREEN
714A 39             00460        RTS
714B 86   30        00470 MINTEN LDA     #$30     STORE ZERO IN
714D B7   041F      00480        STA     $041F    MINUTE LOCATION
7150 B6   041E      00490        LDA     $041E    GET MINUTES
7153 4C             00500        INCA             TENS AND INCREMENT
7154 81   36        00510        CMPA    #$36     SIXTY MINUTES?
7156 27   04        00520        BEQ     HRUNIT   BRANCH IF YES
7158 B7   041E      00530        STA     $041E
715B 39             00540        RTS
715C 86   30        00550 HRUNIT LDA     #$30
715E B7   041E      00560        STA     $041E    SET MINUTES TO ZERO
7161 B6   041C      00570        LDA     $041C
7164 4C             00580        INCA             INCREMENT HOURS TENS
7165 81   34        00590        CMPA    #$34     HRUNIT=4?
7167 27   15        00600        BEQ     CHECK    BRANCH IF YES
7169 81   3A        00610 RETURN CMPA    #$3A     HRUNIT>9?
716B 27   04        00620        BEQ     HRTEN    BRANCH IF YES
716D B7   041C      00630        STA     $041C    PRINT NEW HRUNIT
7170 39             00640        RTS
7171 86   30        00650 HRTEN  LDA     #$30     SET HRUNIT
7173 B7   041C      00660        STA     $041C    TO ZERO
7176 B6   041B      00670        LDA     $041B    ADD ONE
7179 4C             00680        INCA             TO HRTEN
717A B7   041B      00690        STA     $041B    PRINT NEW HRTEN
717D 39             00700        RTS
717E F6   041B      00710 CHECK  LDB     $041B    HOURS=24?
7181 C1   32        00720        CMPB    #$32
7183 27   02        00730        BEQ     SETDAY   BRANCH IF YES
7185 20   E2        00740        BRA     RETURN
7187 108E 041B      00750 SETDAY LDY     #$041B   START OF TIME
718B 8E   3030      00760        LDX     #$3030   SET TIME
```

```
718E BF    041B     00770           STX    $041B     TO 00:00
7191 BF    041E     00780           STX    $041E
7194 B6    0404     00790           LDA    $0404     ADD
7197 4C             00800           INCA             ONE
7198 B7    0404     00810           STA    $0404     DAY
719B BE    0400     00820           LDX    $0400     GET MONTH
719E 8C    3132     00830           CMPX   #$3132    IS MONTH=12?
71A1 27    02       00840           BEQ    ENDYR     BRANCH IF YES
71A3 20    1C       00850           BRA    DAY29
71A5 10BE  0403     00860  ENDYR    LDY    $0403     GET DAY
71A9 108C  3332     00870           CMPY   #$3332    ID DAY=32?
71AD 27    02       00880           BEQ    NEWYR     BRANCH IF YES
71AF 20    10       00890           BRA    DAY29
71B1 8E    3031     00900  NEWYR    LDX    #$3031    SET NEW
71B4 BF    0400     00910           STX    $0400     DATE 01/01
71B7 BF    0403     00920           STX    $0403
71BA B6    0407     00930           LDA    $0407     GET YEAR
71BD 4C             00940           INCA             ADD 1 YEAR
71BE B7    0407     00950           STA    $0407     PRINT YEAR
71C1 BE    0403     00960  DAY29    LDX    $0403     IS DAY
71C4 8C    3239     00970           CMPX   #$3239    29?
71C7 27    16       00980           BEQ    MOTEST    BRANCH IF YES
71C9 8C    3331     00990           CMPX   #$3331    IS DAY=31?
71CC 27    0C       01000           BEQ    THIRTY    BRANCH IF YES
71CE 8C    3332     01010           CMPX   #$3332    IS DAY=32?
71D1 27    02       01020           BEQ    LSTDAY    BRANCH IF EQUAL
71D3 20    0D       01030           BRA    COMP
71D5 BD    722B     01040  LSTDAY   JSR    RESET
71D8 20    08       01050           BRA    COMP
71DA BD    720E     01060  THIRTY   JSR    MSHORT
71DD 20    03       01070           BRA    COMP
71DF BD    71F7     01080  MOTEST   JSR    FEBCHK
71E2 B6    0404     01090  COMP     LDA    $0404
71E5 81    3A       01100           CMPA   #$3A      IS DAY UNIT>9?
71E7 27    01       01110           BEQ    DAYTEN    BRANCH IF YES
71E9 39             01120           RTS
71EA 86    30       01130  DAYTEN   LDA    #$30      SET DAY UNIT
71EC B7    0404     01140           STA    $0404     TO ZERO
71EF B6    0403     01150           LDA    $0403     ADD ONE
71F2 4C             01160           INCA             TO
71F3 B7    0403     01170           STA    $0403     DAY TEN
71F6 39             01180           RTS
71F7 10BE  0400     01190  FEBCHK   LDY    $0400     IS MONTH
71FB 108C  3032     01200           CMPY   #$3032    EQUAL TO 02?
71FF 27    01       01210           BEQ    FEBSET    BRANCH IF YES
7201 39             01220           RTS
7202 8E    3031     01230  FEBSET   LDX    #$3031    SET DAY
7205 BF    0403     01240           STX    $0403     TO ZERO
7208 86    33       01250           LDA    #$33      SET MONTH
720A B7    0401     01260           STA    $0401     TO 03
720D 39             01270           RTS
720E 10BE  0400     01280  MSHORT   LDY    $0400     IS MONTH
7212 108C  3034     01290           CMPY   #$3034    EQUAL TO 04?
7216 27    13       01300           BEQ    RESET     BRANCH IF YES
7218 108C  3036     01310           CMPY   #$3036    MONTH 06?
721C 27    0D       01320           BEQ    RESET     BRANCH IF YES
721E 108C  3039     01330           CMPY   #$3039    MONTH 09?
7222 27    07       01340           BEQ    RESET     BRANCH IF YES
7224 108C  3131     01350           CMPY   #$3131    MONTH 11?
7228 27    01       01360           BEQ    RESET     BRANCH IF YES
722A 39             01370           RTS
722B 8E    3031     01380  RESET    LDX    #$3031    SET DAY
722E BF    0403     01390           STX    $0403     EQUAL TO ZERO
7231 B6    0401     01400           LDA    $0401     ADD ONE
7234 4C             01410           INCA             TO
7235 B7    0401     01420           STA    $0401     MONTH
7238 BE    0400     01430           LDX    $0400     GET MONTH
723B 8C    303A     01440           CMPX   #$303A    IS MONTH>9?
723E 27    01       01450           BEQ    MONTEN    BRANCH IF YES
7240 39             01460           RTS
7241 8E    3130     01470  MONTEN   LDX    #$3130    SET MONTH
7244 BF    0400     01480           STX    $0400     TO TEN
7247 39             01490           RTS
           0000     01500           END
00000 TOTAL ERRORS
```

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An Educational Adventure For The CoCo And MC-10

By Fred B. Scerb
Rainbow Contributing Edito

Editor's Note: If you have an idea for the "Wishing Well," submit it to Fred c/o THE RAINBOW. *Remember, keep your ideas specific, and don't forget that this is* BASIC. *All programs resulting from your wishes are for your use but remain the property of the author.*

With our first issue of 1986 as my first "Wishing Well" New Year's resolution, I am going to keep the promise I made to all of you in last month's issue. After years of putting it off, this month you will see my first original Adventure game called *Math Miner.* What is very special about *Math Miner* is that besides being a very different kind of Adventure game involving some of the features you have come to expect from that genre, it is an educational program as well. And, it also works on the MC-10, CoCo's little brother, which so many have written to tell me you still have and use.

The Wish

Many of you have suggested I create an Adventure game. I have to be honest, though — I really don't like Adventure games! There have been only one or two that I have played to completion because I simply do not have the patience an Adventure game requires. (For that matter, I have never finished a game of "Monopoly" and only rarely have played a chess game to completion, without a computer that is!) Still, I must admit I have been very impressed with some of the Adventure games. However, even though these may be fun to play, I have always hoped this time could be spent in a more educational way. Don't get me wrong. I do believe an Adventure game can have some real educational benefits in and of itself. The verbal and deductive skills required to play one can indeed be worth reinforcing.

Since much of my mail has encouraged me to create more generic educational software, the combination of these two fields can help me grant two wishes at once. Add to that the real desire from some of you to see more MC-10 versatility, and we have three wishes in one: an educational Adventure that works with just 16K Color BASIC or a 20K MC-10.

The Inspiration

Years ago, when I first started writing programs for the Color Computer, I was in the same position of many new CoCo owners. I wanted to get as much classroom use out of the old silver chassis as time and creativity would permit. Since almost no one was creating anything for our CoCo at the time I purchased many books looking fo programs I could translate to Colo BASIC.

One such book that I found wa *Mostly BASIC: Applications for you TRS-80*, by Howard Berenbon (Howard W. Sams & Co., Inc., Indiana 1980). Mr. Berenbon's book containe a number of programs designed for th Model III. I was very interested in listing called *The Dungeon of Htam* which was listed as an educationa Adventure game. It took many hours t translate the program's Level II BASI to fit the screen limitations of the 32 b 16 CoCo screen. Finally, I got a working version debugged enough to allo my students a chance to try somethin different on the computer.

What was interesting about *Dungeo of Htam* (which is math spelled backwards) was its use of the typical Adventure commands such as 'N', 'S', 'E' an 'W', its "Math Monsters" named DDA BUS, LUM and VID (add, sub, mul an div) and a map that helped you fin your way around the dungeon — if yo could find it. *Htam* had two levels, an certain rooms had trap doors that coul be, in the words of the game, costly.

My students liked *Htam*, but it wa not really that flexible for my purposes There were no difficulty levels to control the types of problems created and

(Fred Scerbo is a special needs instructor for the North Adams Public Schools in North Adams, Mass. He holds a master's in education and has published some of the first software available for the Color Computer through his software firm, Illustrated Memory Banks.)

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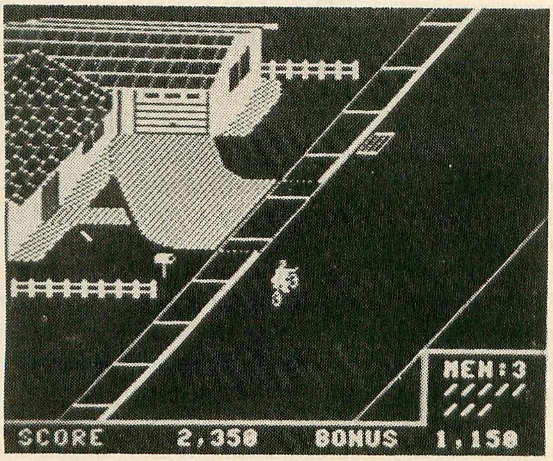

As a paper boy, you ride your bike along your route delivering papers to your customers. Break customers' windows or damage their property and they will cancel their subscriptions! Earn bonus points by damaging non-subscribers' property. Avoid pedestrians, cars, and maybe even a mad dog in your attempt to deliver all your papers! Detailed graphics and lots of surprises make this game a real challenge for everyone.

64 k and joystick required
tape or disk

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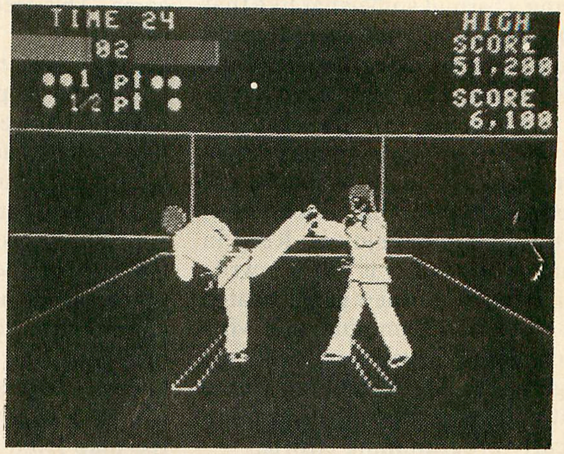
KARATE



Challenge the computer, or a friend to a Karate match! You can even challenge an opponent across town if you have a modem. In this game, you will use various Karate punches and kicks to knock your opponent down and earn points to win the match. When challenging the computer, your opponent's Karate skills increase as you win matches. This game is a challenge for even the expert game player.

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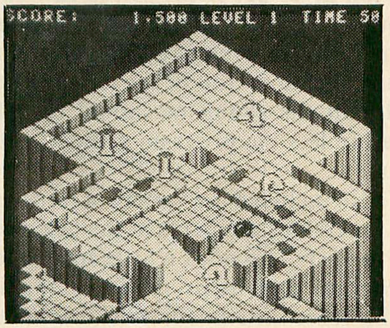
MARBLE MAZE



Move your marble around the mazes in your search for the finish line! Avoid the marble eaters, acid puddles and other creatures that inhabit the mazes. Avoid falling into holes or off the edges of the maze. Eight different levels and great graphics make this game a must for your collection. Congratulations to the contest winners!

64 k and joystick required

tape or disk **$28.95** *U.S.*
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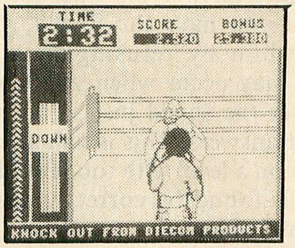
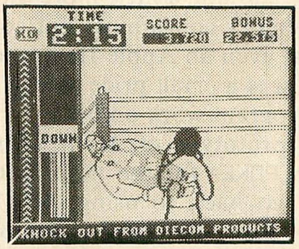
KNOCK OUT





Fight against five different boxers in this great boxing game! At first the boxers are easy to knock out, but beware, it gets harder as you move on. The boxers are out to stop you in your quest to become champion of the world. But once you become champion your task is not over. You will then have to defend your title against those trying to regain the championship from you. Outstanding graphics make this a must for your collection!

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unless you found the map, the game was difficult to get around in using 'N', 'S', 'E' and 'W' as directions.

In recent years, *Htam* has not gotten much use unless a student would ask, "Do you still have that dungeon game?" Therefore, I finally decided the time was right to create my own math Adventure game using a format somewhat like that of *Htam*. This time, however, I could start from scratch using some of the programming techniques I have developed in recent years. I would create my own Adventure world and have control over what kind of math problems are presented so that even my lowest level math students could enjoy it. Keep in mind that *Math Miner* is not a rewrite of *Htam*. It is a totally new game created solely for the Color Computer and MC-10, which *Htam* never was. Still, my thanks go out to Mr. Berenbon, whose excellent book provided the inspiration for my early programming efforts.

The Program

One thing you will notice about the listing for *Math Miner* is that the program lines are shorter than usual for a "Wishing Well" program. This is for two reasons. First, MC-10 only allows a line 128 characters long as oppposed to CoCo's 255. Secondly, since MC-10 doesn't have a built-in EDIT command, I wanted to keep the lines as short as possible so any retyping of errors could be kept to a minimum.

Another difference you will notice is the absence of the ELSE command, which is missing from MC-10's IF/THEN command. The loss of ELSE makes programming a little more difficult and memory consuming, but considering that even an Apple IIe doesn't have ELSE, it is a small price to pay to make the program work on both.

My first prototype of *Math Miner* used screen POKEs for the map, but I decided to go back to using PRINT@ commands. Since the screen memory for MC-10 is different than CoCo's, I usually had to use a screen offset value (MC in the listing) for every POKE used. My first translation kept locking up because of a misplaced POKE value. I soon discovered the source of the bug and fixed it, but I again realized how easy it might be for someone typing in the program to lose it all to a typo in the POKEs. Therefore, I did a little rewriting and used the offset on a PEEK command instead, which is not program destructive as a POKE can be. (POKE in the wrong place and BASIC can be changed in ways you may not like!) Either way, the program works just fine, but you will still have to make one line change to translate to MC-10. More on that later.

Running the Program

If you are using a 16K Extended machine, PCLEAR1 before loading the game. This frees up the extra memory needed.

Math Miner takes place in a cavernous mine deep underground. You start out at the lowest level with 500 units of fuel in your backpack. This fuel is used later when you make it to the surface/roof area where a helicopter awaits to aid in your escape. You must accumulate enough fuel to fly the copter away.

Instead of using 'N', 'S', 'E' and 'W' commands, your movements can be made by using the arrow keys. The map always appears in front of you. (There is even a routine built in that prevents the map from scrolling off the screen.) Each of the five levels is an 8 by 8 grid. Your position is indicated by a set of brackets on the screen. Move the arrow keys and the brackets will move on the map.

There are two symbols on the map. "TR" stands for treasure room, where you can answer a math question and earn fuel points. "PW" stands for passageway and is your way of moving from one level to another. You can only use a passageway if a certain number of questions have been correctly answered (anywhere from five to 15).

A spirit creature also roams the empty corridors. If he approaches you, you must answer his question. However, if you have the Shield, you can ignore him by refusing to lower it. Times may occur when you may want to lower the shield just to accumulate correct answers. This is valuable if you end up on a level with too few TRs. The shield is found by correctly answering certain problems.

Upon entering a passageway, it may transport you to the next highest level. On other occasions, it may not be in working order and tell you to return later. Still other times, you might fall through a trap door to a lower level. If you have the Magic Wand, you are protected from falling through, but may find the wand vanishes from your hand. To keep track of inventory, press 'I' for an accounting of what you are carrying.

Once the fifth level has been reached, you must also locate the key to the helicopter. If all these elements are in place and there is enough fuel, you can exit the level and escape to the roof. You are then presented with your game statistics.

If it is necessary to end a game early, pressing the '@' button asks if you wish to quit. 'Y' ends the game while 'N' continues it. This prevents accidentally ending a game by hitting the wrong key.

One of the routines incorporated into this program is my own version of the INPUT command using INKEY$. The screen reacts exactly as if using INPUT while ignoring the letters on the keyboard, which should not be included in a mathematical answer. The backspace arrow erases errors and you must still press ENTER to record your answer. The main advantage of the routine is that it effectively neutralizes the CLEAR key. My students have used educational programs from other sources that use INPUT, and pressing the CLEAR key while in this mode wipes the entire screen clean, removing any work the student has done. This can be very frustrating in an educational program, so I developed this routine to bypass that problem.

Educational Uses

Math Miner lets you choose from addition, subtraction, multiplication and division, or a combination of any of these. On running the program select the numbers 1-4, which give the type of math problems. You may then choose a difficulty level (1-5) that controls how hard the problems will be. Next, choose whether you want the problem types assorted. Pressing 'Y' while on multiplication gives problems of the two categories before it (addition and subtraction), while pressing 'N' gives only multiplication. You be the judge of how difficult the problems should be. This feature lets the program grow with the student.

Also included is a variety of responses in the DATA statements at the beginning of the list. This adds a little spice to the program and helps reinforce reading skills since the student must read all the text to effectively play the game.

MC-10 Version Only

I had to make a number of changes to make this program work on the MC-10's cramped keyboard. MC-10 does not have separate arrow keys like the CoCo. Instead, to use the backspace arrow or cursor controls, the control key must be held down while hitting either 'A', 'S', 'W' or 'Z'. Since these keys are visibly marked with the arrow ymbols, I made a change in the pro-ram to allow it to react to those letters ithout having to press the control key. his is also true when using the back-pace arrow to correct an answer on a ath problem. Press the 'A' key, which normally the backspace with control, nly you don't need to use the control ey.

To keep the line changes to a min-mum, I used variables A1, A2, A3 and 4 to stand for the ASCII values of the eys pressed. If you type in the listing s shown, the values of the arrow keys re used. However, if you wish to use he 'A', 'S', 'W' and 'Z' keys, Line 15 ust be changed so it is no longer a `REM` ith an `IF/THEN` statement. Therefore, eplace Line 15 with:

```
15 MC=15360:A1=87:A2=90:
A3=65:A4=83
```

Use of the `REM` in the listing prevents these values from being used in the CoCo version. If you forget to change these values with the MC-10, you will find that the screen keeps flashing because the wrong memory location is being checked to see if the map scrolled off the screen. If this happens, make the change in Line 15.

The use of these variables at the beginning of the program ensures that only one change be made to switch machines. I think you will find this much easier than having to alter a half-dozen lines.

I have spent a good deal of time testing this out on the MC-10, but it is possible that I did not encounter every combination it generates. Therefore, if you get an ?SN Error in any line, retype it with spaces inserted between the BASIC commands. MC-10 interprets BASIC a little differently than the CoCo, so a line that works on CoCo without spaces may not always work on the MC-10 without inserting them.

All Models

Be sure to type in the `DATA` statements exactly as they appear. This makes sure we do not get any word-wrap problems.

Conclusion

Give *Math Miner* a try. Those with youngsters in the family will find that they will spend a good deal of time trying to increase their scores. Most importantly, however, is my hope that this program may inspire one of you to create something original much the way those early programs I experimented with did for me. ☐

70	103	635	251
170	51	725	69
240	97	800	172
340	233	920	34
430	221	980	89
540	52	END	46

The listing: `MATHMINR`

```
1 REM***************************
2 REM*   MATH MINER (C)1985     *
3 REM*    BY FRED B.SCERBO      *
4 REM*    60 HARDING AVENUE     *
5 REM* NORTH ADAMS, MA. 01247 *
6 REM***************************
10 CLS0:CLEAR400:DIMR(8,8,5),PS(
8,8):A1=94:A2=10:A3=8:A4=9
15 REM IF MC-10 THEN MC=15360:A1
=87:A2=90:A3=65:A4=83
20 READI:IFI=0THEN35
25 FORY=1TO7:SET(I,Y,1):NEXT
30 GOTO20
35 READI:IFI=0THEN50
40 SET(I,1,1):GOTO35
45 DATA1,4,7,10,14,18,22,25,30,3
3,36,39,42,48,51,57,0,2,3,5,6,11
,12,13,16,17,19,20,31,32,34,35,0
50 SET(11,4,1):SET(12,4,1):SET(1
3,4,1):SET(23,4,1):SET(24,4,1):F
ORI=1TO6:SET(42+I,I+1,1):NEXT
55 FORI=1TO7STEP3:FORY=52TO54:SE
T(Y,I,1):NEXTY,I:FORI=1TO4STEP3:
FORY=58TO61:SET(Y,I,1):NEXTY,I
60 SET(61,2,1):SET(61,3,1):SET(5
9,5,1):SET(60,6,1):SET(61,7,1)
65 PRINT@162," BY FRED B.SCERBO
(C) 1985 ";
70 PRINT@228," SELECT PROBLEM LE
VEL: ";:PRINT@294," 1) ADDITION
      ";:PRINT@326," 2) SUBTRACT
ION    ";
75 PRINT@358," 3) MULTIPLICATION
 ";:PRINT@390," 4) DIVISION
  ";
80 X$=INKEY$:HK=RND(9999):IFX$="
"THEN80
85 LL=VAL(X$):IF LL<1THEN80
90 IF LL>4THEN80
95 PRINT@452," DIFFICULTY LEVEL:
 1-6 ";
100 X$=INKEY$:IFX$=""THEN100
105 DL=VAL(X$):IF DL<1THEN100
110 IF DL>6THEN100
115 DL=DL*75
120 PRINT@452," ASSORTED LEVELS
(Y/N) ";
125 X$=INKEY$:IFX$=""THEN125
130 IFX$="Y"THEN AT=1:GOTO145
135 IFX$="N"THEN AT=0:GOTO145
140 GOTO125
145 CLS0:PRINT@263," PLEASE STAN
D BY ";
150 L=1:H=1:V=1:OH=1:OV=1:UF=500
:PA=0:SP=RND(8)+2
155 SH=0:BP=1::W=320
160 TF=4000+RND(DL)*RND(DL)
165 R$=CHR$(128):B$=R$+R$+R$+R$:
FORI=1TO40:W$=W$+B$:NEXTI
170 FORI=1TO8:FORY=0TO7:PS(Y+1,I
)=32+Y*4+Z:NEXTY:Z=Z+32:NEXTI
175 FORI=1TO5:FORY=1TO8:FORQ=1TO
8:P=RND(5)-1:IF P>2THEN P=0
180 IF P=2THEN P=RND(3)-1
```

```
185 R(Y,Q,I)=P
190 IF P=2THEN Z=1
195 NEXTQ,Y:IFZ=0THENR(8,8,I)=2
200 Z=0:NEXTI
205 R(1,1,1)=0
210 FORI=1TO10:READER$(I):NEXT
215 DATA"THE COAST IS CLEAR. YOU
 MAY MOVETO ANOTHER ROOM.","NO O
NE IS HERE. YOU MAY PROCEED TO A
NOTHER CHAMBER IF YOU DARE!"
220 DATA"SO FAR, SO GOOD! NO DAN
GER IS INSIGHT AT THIS POINT!","
YOUR LUCK IS HOLDING OUT SO FAR.
DON'T GET TOO CARELESS!"
225 DATA"YOU SEE NOTHING BUT DAM
P, BARE  WALLS AROUND YOU. KEEP
GOING."
230 DATA"THE STONE FLOOR IN FRON
T OF YOU HAS A COLD EMPTY LOOK.
GO ON."
235 DATA"THIS HALLWAY APPEARS AS
 EMPTY ASALL THE REST. CONTINUE.
"
240 DATA"YOU'RE LUCKY THAT THE T
ORCHES   ARE LIT TO GUIDE YOUR W
AY. GO !","I HEAR SOMETHING! OH
NO, IT'S   A GHOSTLIKE FIGURE!"
245 DATA"THE SPIRIT CREATURE HAS
 JUST   APPEARED BEFORE YOU!"
250 CLS0:FORI=0TO31:PRINT@I,CHR$
(96);:PRINT@I+288,CHR$(96);:NEXT
255 PRINT@11," LEVEL ";L;
260 PRINT@32,"";
265 FORI=1TO8:FORY=1TO8
270 IFR(Y,I,L)=0THENPRINTB$;
275 IFR(Y,I,L)=1THENPRINTR$CHR$(
116)CHR$(114)R$;
280 IFR(Y,I,L)=2THENPRINTR$CHR$(
112)CHR$(119)R$;
285 NEXTY,I
290 GOTO380
295 PRINT@PS(H,V)R$;:PRINT@PS(H,
V)+3,R$;
300 TN=TN+1:IFUF<=0THEN975
305 IFPEEK(1024+MC)<>0THEN250
310 X$=INKEY$:IFX$=""THEN310
315 IFX$="@"THEN955
320 IFX$=CHR$(A1)THEN V=V-1:GOTO
380
325 IFX$=CHR$(A2)THEN V=V+1:GOTO
380
330 IFX$=CHR$(A3)THEN H=H-1:GOTO
380
335 IFX$=CHR$(A4)THEN H=H+1:GOTO
380
340 IFX$="I"THEN350
```

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```
345 GOTO300
350 PRINT@W,W$;:PRINT@W,"YOU HAV
E"UF"FUEL UNITS.":PRINT"YOU ARE
CARRYING:"
355 IF WA=1THENPRINT"  THE MAGIC
 WAND"
360 IF KY=1THENPRINT"  THE HELIC
OPTER KEY"
365 IF SH=1THENPRINT"  THE ENCHA
NTED SHIELD"
370 IF WA=0 AND KY=0 AND SH=0THE
NPRINT"  ONLY YOUR FUEL PACK."
375 GOTO300
380 IF H<1THEN H=1
385 IF H>8THEN H=8
390 IF V<1THEN V=1
395 IF V>8THEN V=8
400 PRINT@PS(OH,OV),R$;:PRINT@PS
(OH,OV)+3,R$;
405 PRINT@PS(H,V),CHR$(123);:PRI
NT@PS(H,V)+3,CHR$(125);:OH=H:OV=
V
410 IFR(H,V,L)=2THEN495
415 IFR(H,V,L)=1THEN730
420 ER=RND(10):PRINT@W,W$;
425 PRINT@W,ER$(ER):IF ER<9THEN3
00
430 IF SH=0THEN465
435 PRINT"YOU HAVE THE SHIELD! D
O YOU WISHTO LOWER IT (Y/N)?"
440 X$=INKEY$:IFX$="Y"THEN475
445 IFX$="N"THEN455
450 GOTO440
455 PRINT"HE CANNOT HOLD YOU! PR
OCEED ON."
460 GOTO300
465 PRINT"YOU HAVE NO SHIELD SO
YOU MUST  ANSWER HIS QUESTION. <
ENTER>."
470 GOTO480
475 PRINT@384,"YOU MUST ANSWER H
IS QUESTION.   PRESS <ENTER> TO
SEE IT."
480 X$=INKEY$:IFX$<>CHR$(13)THEN
480
485 GOSUB795:IF PA>15THEN755
490 GOTO300
495 CH=RND(3)
500 IF PA<SP THEN510
505 GOTO525
510 PRINT@W,W$;:PRINT@W,"THIS PA
SSAGEWAY WILL NOT WORK   UNTIL Y
OU HAVE SOLVED MORE OF"
515 PRINT"THE PROBLEMS ON THIS L
EVEL. KEEPMOVING ON YOUR QUEST."
520 GOTO300
```

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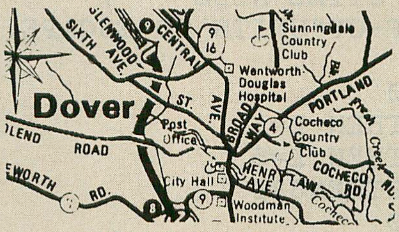

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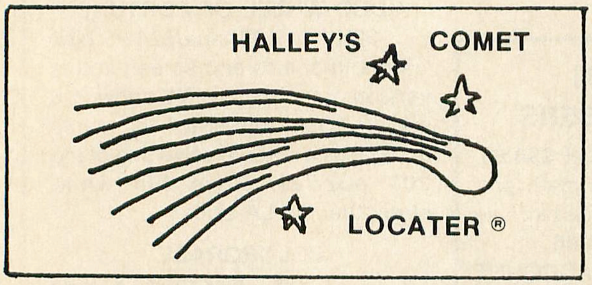
```
525 IF CH=1 AND WA=1THEN535
530 GOTO580
535 PRINT@W,W$;:PRINT@W,"DO YOU
WISH TO USE THE MAGIC    WAND IN
 THIS PASSAGEWAY (Y/N)?"
540 X$=INKEY$:IFX$="Y"THEN555
545 IFX$="N"THEN580
550 GOTO540
555 CH=INT(RND(12)/4):IF CH=0THE
N CH=1
560 IF CH=1THEN570
565 GOTO585
570 PRINT@W,W$;:PRINT@W,"THE WAN
D KEEPS YOU FROM FALLING THROUGH
 A TRAP DOOR, BUT IT THENVANISHE
S FROM YOUR HAND.":WA=0
575 GOTO300
580 IF CH=1THEN L=L-1
585 IF CH=2THEN660
590 IF CH=3THEN L=L+1
595 IF L=0THEN605
600 GOTO615
605 PRINT@W,W$;:PRINT@W,"THE PAS
SAGEWAY LEADS TO NOWHERE.TRY AGA
IN LATER! KEEP MOVING ON.":L=1
610 GOTO300
615 IF L<6THEN660
620 IF KY=0THEN630
625 GOTO640
630 PRINT@W,W$;:PRINT@W,"YOU DO
NOT HAVE THE HELICOPTER  KEY SO
YOU MAY NOT GO TO THE    ROOF YE
T. ":L=5
635 GOTO300
640 IF UF>TF THEN1000
645 PRINT@W,W$;:PRINT@W,"YOU DO
NOT HAVE ENOUGH FUEL YET SO KEEP
 LOOKING FOR MORE CHANCESTO EARN
 FUEL. YOU STILL NEED    ";
650 PRINTTF-UF"UNITS TO ESCAPE."
:L=5
655 GOTO300
660 IF L<1THEN L=1
665 IF L>5THEN L=5
670 IF CH=2THEN680
675 GOTO690
680 PRINT@W,W$;:PRINT@W,"THIS PA
SSAGEWAY ISN'T WORKING ATTHIS TI
ME. TRY AGAIN LATER."
685 GOTO300
690 IF CH=1THEN700
695 GOTO710
700 PRINT@W,W$;:PRINT@W,"A TRAP
DOOR OPENS AND YOU TUMBLEBACK TO
 LEVEL ";L:FORI=1TO1000:NEXTI:SP
=RND(8)+2:PA=0
705 GOTO250
710 IF CH=3THEN720
715 GOTO300
720 PRINT@W,W$;:PRINT@W,"THIS PA
SSAGEWAY TRANSPORTS YOU  UP TO L
EVEL ";L:FORI=1TO1000:NEXT:PA=0:
SP=RND(8)+2
725 GOTO250
730 PRINT@W,W$;:PRINT@W,"YOU ARE
 IN ONE OF MANY SECRET   TREASUR
E ROOMS. YOU CAN READ A  QUESTIO
N CARVED ON THE WALL."
735 PRINT"PRESS <ENTER> TO READ
THE WALL."
740 IFINKEY$<>CHR$(13)THEN740
745 BP=RND(4)+1:GOSUB795:BP=1
750 IF YA<>RR THEN300
755 IF SH=1THEN765
760 GS=RND(10):IF GS=10THENPRINT
"YOU FIND A SHIELD ON THE FLOOR.
":SH=1
765 IF L=5 AND KY=0THEN775
770 GOTO780
775 PRINT"A KEY APPEARS IN YOUR
HAND.":KY=1
780 IF WA=1THEN300
785 GS=RND(10):IF GS=>9THENPRINT
"YOU FIND A WAND ON THE FLOOR.":
WA=1
790 GOTO300
795 PRINT@W,W$;:PRINT@W,"YOU MAY
```

THE ANYONE-CAN-USE



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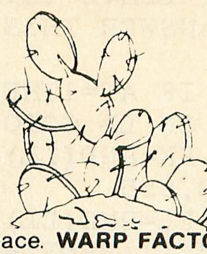

NEW

HALL OF THE KING

This program combines all the things you look for in a great two disk graphics adventure program. The Hi-Res graphics are superbly done. The text portion of the screen and the graphics change quickly as you move through the **HALL OF THE KING.** You can move freely from one portion of the adventure to another. Call up your inventory at any time. You can even save or load a game at ANY time. **HALL OF THE KING** will challenge even the most seasoned adventurer.

In an age long past, a dwarven race lived in their mountain home. They were forced to flee under threat of destruction leaving behind their most powerful possession, the Earthstone. As a prominent adventurer, you will be asked to undertake a perilous quest, the recovery of the Earthstone! This is your FIRST adventure in the search for what is deemed to have been the cornerstone of the legendary power of the dwarves.

HALL OF THE KING requires 64K EB and one disk drive. This exciting two disk adventure comes packaged in a vinyl library case. **$39.95**

WARP FACTOR X

If you have been waiting for a game for your color computer that has everything, your wait is over. **WARP FACTOR X** is here. This all graphics simulation game requires strategy, fast thinking, an eye for detail, and above all experience in knowing the capabilities of your starship and its computer. You will begin your adventure into space as a cadet but your ultimate goal is to become Captain of the Enterprise. To do this you must neutralize the enemy planets and eliminate the Klingon starbases along with the Klingons themselves.The Klingon is not a "Robot." He has the same capabilities as your starship but he is also subject to the same problems. You will find that he is inclined to move around while you are attacking him and may even chase you when you find it prudent to retreat. You must form alliances with neutral planets and bring them into the federation. Many of the planets will have special resources which will help the federation.

WARP FACTOR X was written by an engineer for the Kennedy Space Center and has been three years in the making. You will appreciate the attention to detail and complex inner workings of the program. The program is supported by eight pages of documentation important to the success of your mission. Your progress through the eighteen sectors of the galaxy will be recorded and saved for your next adventure into space. **WARP FACTOR X** includes versions for 32K, 64K, and COCO 2. It requires one disk drive and comes packaged in a vinyl library case. **$34.95**

DR. WHO

DR. WHO is a graphics program based on Britains' number one longest running television series, "Doctor Who". As the game begins you are in control of the Tardis, a time machine disguised as a police call box, and you must find and recover the seven keys to time. To accomplish this feat you will travel around the Galifry Solar System from planet to planet. You must find each planet, fight you way through aliens, and land on each planet. The difficulty level increases with each planet. **DR. WHO** is a real time game. No matter what you are doing energy is being consumed and planets are moving in orbit. All controls and commands are entered through the keyboard. Move your Tardis through the galaxy as you search for far away planets and battle aliens in you quest for the seven keys of time. Your ultimate reward, however, lies out beyond the stars. Requires 32K. **Tape — $24.95; Disk — $29.95**

FAMILY-TREE

FAMILY-TREE is a sophiticated program that can help organize your families' history. Whether you are new to genealogy or an experienced genealogist you will find **FAMILY-TREE** of great assistance. It is specifically designed to organize family relationships and supply information on each person. Information can be listed on the screen or printer even a pedigree chart listing up to 4 generations. Records can be altered or deleted and additions made quickly and easily. Each file can contain over 160 names and, of course, you can have files for every branch of the family. Smaller files can be combined. There is even a help file on the disk version. **TAPE — $24.95; DISK — $29.95**

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```
 NOT LEAVE THIS CHAMBER  UNTIL Y
OU ANSWER THIS QUESTION. WHAT IS
 ";
800 IF AT=1THEN810
805 ON LL GOTO815,825,840,855
810 KK=RND(LL):ON KK GOTO815,825
,840,855
815 FL=RND(DL):SL=RND(DL):PRINTF
L"+"SL;:RR=FL+SL
820 GOTO865
825 FL=RND(DL):SL=RND(DL):IF SL>
FL THEN825
830 PRINTFL"-"SL;:RR=FL-SL
835 GOTO865
840 WL=INT(DL/5):FL=RND(WL):SL=R
ND(WL)
845 PRINTFL"X"SL;:RR=FL*SL
850 GOTO865
855 WL=INT(DL/4):FL=RND(WL)+1:SL
=RND(WL)+1:FL=SL*FL
860 PRINTFL"/"SL;:RR=FL/SL
865 PRINT" ?":PRINT@409,CHR$(175
);
870 Y$=""
875 X$=INKEY$:IFX$=""THEN875
880 IFX$=CHR$(13)THEN920
885 IFX$=CHR$(A3)THEN895
890 GOTO905
```

E.T.T. Electronic Typing Teacher
by CHERRYSoft

Learning to type the right way can save you hours of tedious work when entering programs into your CoCo, and this is just what ETT was designed to do. Devote a little time every day practicing with ETT and before you know it you will be typing with confidence. Entering those programs will no longer be the chore it use to be.

ETT's video keyboard lets you practice with all the keys labeled, all the keys blank or only the "home" keys labeled. The visual cues guide you while you learn to type without watching your fingers. ETT shows your accuracy, response time, and words per minute. You will quickly see that you are improving with practice.

With the sentences provided by ETT learning to type can be fun. Over 1000 variations chosen because they include every letter in the alphabet. You can also create your own practice sets. This outstanding program was written by a certified teacher and professional programmer and comes with a ten page student manual-study guide. Requires 16K Extended Basic.

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```
895 PRINT@409," ":PRINT@409,CHR$
(175);
900 GOTO870
905 IFASC(X$)<48 OR ASC(X$)>57TH
EN875
910 Y$=Y$+X$:PRINT@409,Y$CHR$(17
5);
915 GOTO875
920 YA=VAL(Y$)
925 IF YA=RR THEN935
930 GOTO945
935 PRINT@PS(H,V)+1,R$;:PRINT@PS
(H,V)+2,R$;:PRINT@W,W$;:PRINT@W,
"CORRECT! THE ANSWER IS"RR:PL=RN
D(DL)*BP+1:UF=UF+PL
940 PRINT"YOU GAINED"PL"MORE FUE
L UNITS.":PRINT"YOU NOW HAVE"UF"
FUEL UNITS.":PA=PA+1:R(H,V,L)=0:
CR=CR+1:RETURN
945 PRINT@W,W$;:PRINT@W,"SORRY!
THE ANSWER IS"RR:PL=RND(DL*2)+1:
UF=UF-PL:PRINT"YOU HAVE LOST"PL"
FUEL UNITS."
950 PRINT"YOU ONLY HAVE"UF"LEFT!
":WR=WR+1:RETURN
955 PRINT@W,W$;:PRINT@W,"DO YOU
WANT TO QUIT (Y/N) ?"
960 X$=INKEY$:IFX$="Y"THEN1015
965 IFX$="N"THEN250
970 GOTO960
975 PRINT@W,W$;:PRINT@W,"SORRY Y
OU LOST ALL YOUR FUEL    AND ARE
 NOW TRAPPED IN THESE"
980 PRINT"CASTLE WALLS FOREVER.
TOO BAD!  PRESS ENTER FOR YOUR S
TATISTICS.";
985 X$=INKEY$:IFX$=""THEN1010
990 IFX$=CHR$(13)THEN1015
995 GOTO985
1000 PRINT@W,W$;:PRINT@W,"YOU MA
KE IT TO THE ROOF.YOU HAVETHE KE
Y & MORE THAN ENOUGH FUEL TO ESC
APE. CONGRATULATIONS!"
1005 PRINT"PRESS ENTER FOR YOUR
STATISTICS.";
1010 X$=INKEY$:IFX$<>CHR$(13)THE
N1010
1015 CLS:PRINT@101,"YOU USED"TN"
MOVES AND":PRINT@165,"ANSWERED"C
R"CORRECTLY"
1020 PRINT@229,"WHILE DOING"WR"W
RONG.":NQ=CR+WR:IF NQ=0THENNQ=1
1025 MS=INT(CR/NQ*100):PRINT@293
,"YOUR SCORE IS"MS"%."
1030 PRINT@357,"ANOTHER TRY (Y/N
) ?";
1035 X$=INKEY$:IFX$="Y"THEN RUN
1040 IFX$="N"THENCLS:END
1045 GOTO1035
```

RAINBOW Info

How To Read Rainbow

Please note that all the BASIC program listings you find in THE RAINBOW are formatted for a 32-character screen — so they show up just as they do on your CoCo screen. One easy way to check on the accuracy of your typing is to compare what character "goes under" what. If the characters match — and your line endings come out the same — you have a pretty good way of knowing that your typing is accurate.

We also have "key boxes" to show you the *minimum* system a program needs. But, *do* read the text before you start typing.

Finally, the little cassette symbol on the table of contents and at the beginning of articles indicates that the program is available through our RAINBOW ON TAPE service. An order form for this service is on the insert card bound in the magazine.

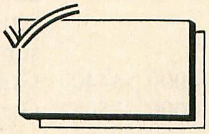
What's A CoCo

CoCo is an affectionate name that was first given to the Tandy Color Computer by its many fans, users and owners.

However, when we use the term CoCo, we refer to both the Tandy Color Computer and the TDP System-100 Computer. It is easier than using both of the "given" names throughout THE RAINBOW.

In most cases, when a specific computer is mentioned, the application is for that specific computer. However, since the TDP System-100 and Tandy Color are, for all purposes, the same computer in a different case, these terms are almost always interchangeable.

The Rainbow Check Plus



The small box you see accompanying a program listing in THE RAINBOW is a "check sum" system, which is designed to help you type in programs accurately.

Rainbow Check PLUS counts the number and values of characters you ype in. You can then compare the number you get to those printed in THE RAINBOW. On longer programs, some benchmark lines are given. When you reach the end of one of those lines with your typing, simply check to see if the numbers match.

To use *Rainbow Check PLUS*, type in the program and CSAVE it for later use, then type in the command RUN and press ENTER. Once the program has run, type NEW and ENTER to remove it from the area where the program you're typing in will go.

Now, while keying in a listing from THE RAINBOW, whenever you press the down-arrow key, your CoCo gives the check sum based on the length and content of the program in memory. This is to check against the numbers printed in THE RAINBOW. If your number is different, check the listing carefully to be sure you typed in the correct BASIC program code. For more details on this helpful utility, refer to H. Allen Curtis' article on Page 21 of the February 1984 RAINBOW.

Since *Rainbow Check PLUS* counts spaces and punctuation, be sure to type in the listing exactly the way it's given in the magazine.

```
10 CLS:X=256*PEEK(35)+178
20 CLEAR 25,X-1
30 X=256*PEEK (35)+178
40 FOR Z=X TO X+77
50 READ Y:W=W+Y:PRINT Z,Y;W
60 POKE Z,Y:NEXT
70 IFW=7985THEN80ELSEPRINT
   "DATA ERROR":STOP
80 EXEC X:END
90 DATA 182, 1, 106, 167, 140, 60, 134
100 DATA 126, 183, 1, 106, 190, 1, 107
110 DATA 175, 140, 50, 48, 140, 4, 191
120 DATA 1, 107, 57, 129, 10, 38, 38
130 DATA 52, 22, 79, 158, 25, 230, 129
140 DATA 39, 12, 171, 128, 171, 128
150 DATA 230, 132, 38, 250, 48, 1, 32
160 DATA 240, 183, 2, 222, 48, 140, 14
170 DATA 159, 166, 166, 132, 28, 254
180 DATA 189, 173, 198, 53, 22, 126, 0
190 DATA 0, 135, 255, 134, 40, 55
200 DATA 51, 52, 41, 0
```

Using Machine Language

Machine language programs are one of the features of THE RAINBOW. There are a number of ways to "get" these programs into memory so you can operate them.

The easiest way is by using an editor/assembler, a program you can purchase from a number of sources.

An editor/assembler allows you to enter mnemonics into your CoCo and then have the editor/assembler assemble them into specific instructions that are understood by the 6809 chip that controls your computer.

When you use an editor/assembler, all you have to do, essentially, is copy the relevant instructions from THE RAINBOW's listing into CoCo.

Another method of getting an assembly language listing into CoCo is called "hand assembly." As the name implies, you do the assembly by hand. This can *sometimes* cause problems when you have to set up an ORIGIN statement or an EQUATE. In short, you have to know something about assembly to hand-assemble some programs.

Use the following program if you wish to hand-assemble machine language listings:

```
10 CLEAR200,&H3F00:I=&H3F80
20 PRINT "ADDRESS:";HEX$(I);
30 INPUT "BYTE";B$
40 POKE I,VAL("&H"+B$)
50 I=I+1:GOTO 20
```

This program assumes you have a 16K CoCo. If you have 32K, change the &H3F00 in Line 10 to &H7F00 and change the value of I to &H7F80.

The Rainbow Seal

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The Rainbow Certification Seal is our way of helping you, the consumer. The purpose of the Seal is to certify to you that any product that carries the Seal has been physically seen by us, that it does, indeed, exist and that we have a sample copy here at THE RAINBOW.

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The Seal, however, is not a "guarantee of satisfaction." The certification process is different from the review process. You are encouraged to read our reviews to determine whether the product is right for your needs.

There is absolutely no relationship between advertising in THE RAINBOW and the certification process. Certification is open and available to any product pertaining to CoCo. A Seal will be awarded to *any* commercial product, regardless of whether the firm advertises or not.

We will appreciate knowing of instances of violation of Seal use.

16K
ECB

COCO MATH CLASS

By Mary and James Lamonica

Versatile and interactive with traditional teaching methods, this program lets you generate math problems for addition, subtraction or a combination of both

My wife, a math teacher, and I have found that most of the arithmetic programs available are lacking in certain areas. We tried to create a program that would be versatile and interactive with traditional teaching methods. In *Add/Sub5*, we think we have achieved our goal.

Add/Sub5 has three levels of difficulty based on the number of digits. Addition, subtraction or a combination of both may be generated. You may also include both positive and negative numbers in the problems if desired.

All of the student's responses are done with the `INKEY$` statement to simplify and speed up operation. The back-arrow key may be used to erase if the student makes a typing error. Two colored bands move across the screen after the problem is printed. This is designed to make the student think and not just enter the first answer that pops into his or her head.

When a student answers incorrectly, the problem and the incorrect response are stored in an array and may be printed out at the end.

In creating this program, we made use of subroutines to do repetitive operations. We also used the `LEN` function for determining the correct `PRINT@` location. This was necessary because of the importance of position in our arithmetic system. To use this, we also had to make use of the `STR$` function. Lines 8225 to 8255 and lines 8290 to 8310 illustrate the use of combinations of the `LEN` and `STR$` functions.

The program was written with a 16K standard BASIC Color Computer. It will run with 16K Extended, but since it needs almost 9K of RAM, it is necessary to type `PMODE0:PCLEAR1` before you `CLOAD` the program.

(Any questions you may have concerning *Add/Sub5* may be directed to the author at 5041 Alabama, Apt. 4, El Paso, TX 79930, phone 915-562-5097. Please enclose an SASE when writing.) ☐

Line	Description
1000 -1500	Generates main menu
2000 -2060	Generates submenus
2100 -2230	Converts to negative numbers
3000 -3100	Checks for the correct response, keeps score and prompts for another problem or a return to the submenu
4000 -4440	Graphics subroutines
6000 -7545	Generates single digit problems
8000 -9435	Generates double digit problems
10000-11435	Generates triple digit problems
12000-12060	Stores incorrect problems and responses
13000-13100	Printout routine
14000-14020	Prompts for printout when array maximum of 50 incorrect is reached

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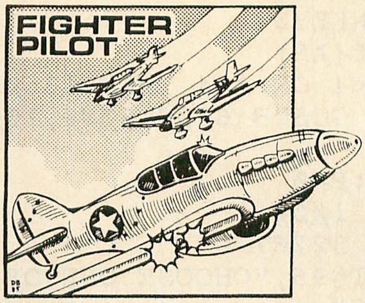

Fighter Pilot

An original arcade game! Wave after wave of attacking aircraft attempt to shoot you down as you maneuver your fighter into the wild blue yonder, blasting enemy fighters, bombers and paratroopers out of the sky. Joystick or keyboard operation. "Pause game" feature. Disk version saves high scores. 32K, 100% Machine Language.

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Mission of Vengeance

A fantasy graphics adventure. You are Garotte Severinn, master thief, spy, and assassin. Your mission is to kill the evil wizard Neemon, recover the holy scepter of Tash, and escape from Neemon's castle. The reward is a fortune in gold, but beware...many dragons and monsters stand between you and the gold! 32K, one disk drive required.

Disk or Amdek $24.95

Menu Maker

The ultimate in easy disk access and organization! Menu Maker is a 100% machine language utility that allows you to place attractive, customized menus on all of your diskettes and, with only one key press, load any program of your choice. Menu Maker is compatible with RS DOS 1.0 and 1.1 (soon with others!) and supports multiple-drive systems. 32K, one disk drive required. One of this year's best utilities!

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Magazine Index System

M.I.S. helps you organize and keep track of those important magazine articles. Features include transfer utility insuring compatibility with other database programs, fast search routines, and the saving of data in a compressed format for more records per disk. 16K, one disk drive required.

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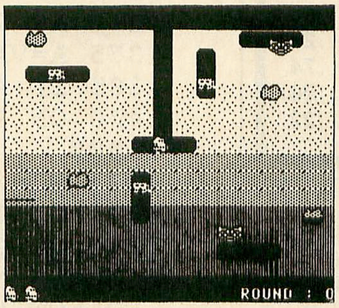

Pumpman

You'll dig this 100% machine language arcade game! The Pumpman carries a pump that he fires at aliens Pooky and Dragon as they change forms and chase him around under the ground. 15 different screens. "pause game" feature. As fun and challenging as the original arcade version! 32K, one joystick required.

Tape $24.95 Disk $29.95

HIRES +
High Resolution Screen Enhancer

HIRES + is a programmer's utility that adds a number of features to BASIC: a high resolution screen with true upper and lower case letters and variable screen width, scroll protect, key repeat, error-trapping, visual input routine, reset protection, true break disable and more! 16K tape.

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Label Maker 3.0

A utility for printing labels, compatible with all types of printers. Features include Hi-Res screen preview before printing, automatic centering, up to nine lines of copy, changeable baud rates, variable font selection. All defaults can be customized. Supplied on tape, can be transferred to disk. 32K Extended.

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The Best Epson Screen Dump

An easy-to-use screen dump utility for Epson and compatible printers. Three sizes of printouts (11 by 7 cm., 17 by 17 cm., and 28 by 28 cm.), double-strike option, reverse printing switch, use of double-density, bit-image mode, allows you to view the graphics screen before printing. 16K, supplied on tape, disk transferable.

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EAGLE
BY
ART MARTIN

EAGLE

A graphic-enhanced lunar lander simulator. The pilot breaks out of lunar orbit and attempts a landing on the lunar surface. Joysticks control thrust and craft altitude and information is continually displayed on horizontal and vertical velocities, acceleration values, fuel consumption and much more. Enhanced disk version allows choice of landing site between Mars and Earth's moon. Takeoffs from the surface can be made and the upper stage placed back in orbit. A great tool for that future astronaut or physicist. 32K, 2 joysticks required.

Tape $24.95 Disk $29.95

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1500	246	8905	186
3060	117	10010	215
6010	40	10287	66
6537	223	10872	27
7130	173	12000	74
8070	215	13034	96
8300	20	END	22

The listing: ADD SUBS

```
5 DIM WA$(50)
1000 CLS(3):SOUND128,2:SOUND128,
4
1050 PRINT@64,"THIS IS A PROGRAM
 OF ADDITION & SUBTRACTION PROBL
EMS WRITTEN BY JAMES & MARY JEAN
 LAMONICA, 1983";
1100 PRINT"ENTER YOUR NAME BELOW
 AND THEN  CHOOSE ONE OF THE FOL
LOWING BY  PRESSING THE NUMBER"
1150 PRINTTAB(5)"(1) SINGLE DIGI
T"
1200 PRINTTAB(5)"(2) DOUBLE DIGI
T"
1250 PRINTTAB(5)"(3) TRIPLE DIGI
T"
1255 PRINTTAB(5)"(4) PRINT OUT I
NCORRECT               RESPONSES"
1260 PRINT@448,"ENTER YOUR NAME
HERE ";
1270 INPUT SN$
1350 A$=INKEY$
1375 A=VAL(A$)
1385 IF A<1 OR A>4 THEN 1350
1400 ON A GOSUB 6000,8000,10000,
13000
1425 SC=0:P=0
1450 GOTO 1000
1500 GOTO 32767
2000 PRINT@96,"CHOOSE ONE OF THE
 FOLLOWING"
2010 PRINTTAB(10)"(1) ADDITION"
2020 PRINTTAB(10)"(2) SUBTRACTIO
N"
2030 PRINTTAB(10)"(3) MIXED"
2040 PRINTTAB(10)"(4) MAIN MENU"
2060 RETURN
2090 CLS(3)
2100 PRINT@64,"DO YOU WANT TO IN
CLUDE NEGATIVE NUMBERS IN THE PR
OBLEMS ?        (Y=YES, N=NO)"
2110 IN$=INKEY$
2120 IF IN$="Y" OR IN$="N" THEN
2130
2125 GOTO 2110
2130 RETURN
2200 RS=RND(3)
2210 IF RS=1 OR RS=3 THEN X=-1*X
2220 IF RS=2 OR RS=3 THEN Y=-1*Y
2230 RETURN
3000 IF Z1=Z THEN SC=SC+1
3020 IF Z1=Z THEN PRINT@352,"YOU
 ARE CORRECT! ";SN$ ELSE PRINT@3
52,"INCORRECT! THE ANSWER IS "Z
3025 IF Z1=Z THEN GOSUB 4200 ELS
E GOSUB 4400
3030 P=P+1
3040 PRINT"SCORE="SC" OUT OF"P
3050 PRINT"NEXT PROBLEM (N)"
3060 PRINT"SUB-MENU (M)"
3070 IF Z1<>Z THEN GOSUB 12000
3080 Z1$="":Z2$=""
3100 RETURN
4000 FOR H=0TO63
4010 SET(H,0,4)
4020 SET(H,1,4)
4030 SET(H,2,5)
4040 SET(H,3,5)
4050 SET(H,18,4)
4060 SET(H,19,4)
4070 SET(H,20,5)
4080 SET(H,21,5)
4090 NEXT H
4100 RETURN
4200 SOUND 89,6
4210 SOUND 125,6
4220 SOUND 147,6
```

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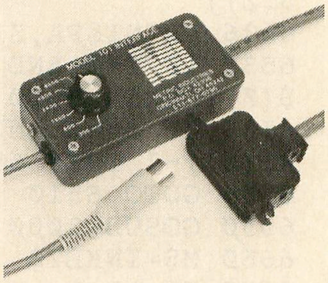
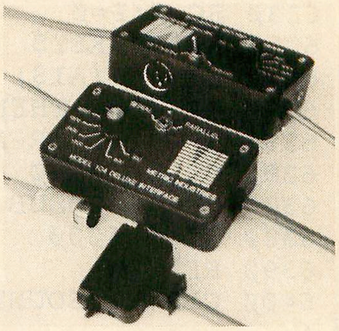


Model 104 Deluxe Interface $51.95 NEW

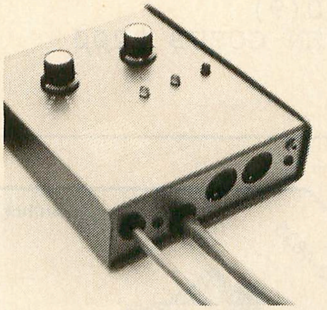
The Model 104 is a serial to parallel interface like the Model 101 but it has the added feature of a serial port (sometimes referred to as a modem switch). This feature allows the connection of a parallel printer and any serial device (modem, serial printer etc.) to your computer. You may then select either output, serial or parallel, with the flip of a switch. The 104 is only 4.5" × 2.5" × 1.25" and comes with all cables and connectors for your computer. You supply the serial cable for your modem or other serial device.



Model 103 Combo $68.95

With the turn of a knob the model 103 switches your computer's RS232C serial port to any one of 3 outputs — 2 serial and 1 parallel. The serial ports may be used for modems, serial printers or even another computer. The parallel port can be used with any Centronics compatible printer. The 103 has the best features from the 101 and 102: color coded position indicator lights, 6 switch selectable baud rates, heavy anodized aluminum cabinet, and many more.

MODEL 103
SWITCHER-INTERFACE COMBO



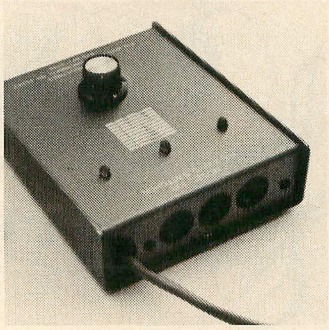
IMPORTANT!

THE 101, 103 AND 104 ALL REQUIRE POWER IN ORDER TO OPERATE. MOST PRINTERS CAN SUPPLY POWER TO YOUR INTERFACE. STAR, RADIO SHACK, AND OKIDATA ARE JUST A FEW THAT DO. EPSON DOES NOT. THE INTERFACES CAN ALSO BE POWERED BY AN AC ADAPTER (RADIO SHACK MODEL 273-1431 PLUGS INTO ALL MODELS). IF YOU REQUIRE A POWER SUPPLY, ADD A "P" TO THE MODEL NUMBER AND $5.00 TO THE PRICE. (MODEL 101P $44.95, MODEL 104P $56.95 AND MODEL 103P $73.95)

Model 102 Switcher $35.95

The Model 102 has 3 switch positions that allow you to switch your computer's serial output between 3 different devices (modem, printers or another computer). The 102 has color coded lights that indicate the switch position. These lights also act as power indicators to let you know your computer is on. Supplied with the 102 are color coded labels that can be applied to your accessories. The 102 has a heavy guage anodized aluminum cabinet with non-slip rubber feet.

MODEL 102
RS-232-C SWITCHER



The Model 101, 102, 103 and 104 will work with any COCO, any level basic and any memory size. These products are covered by a **1 year warranty.**

The Model 101, 103 and 104 work with any standard parallel input printer including Gemini, Epson, Radio Shack, Okidata, C. Itoh and many others. They support BASIC print commands, word processors and graphic commands.

Cassette Label Program $6.95

This fancy printing utility prints 5 lines of information on pinfeed cassette labels. "Cassette Label" is menu driven and is very easy to use. It uses the special features of your printer for standard, or condensed characters. Each line of text is automatically centered. Before the label is printed, it is shown on your CRT — enabling you to make changes if you like — then print 1, 2 or 100 labels. The program comes on tape and it is supplied with 24 labels to get you started. 16K ECB required.

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```
4230 SOUND 176,12
4240 RETURN
4400 SOUND 58,6
4410 SOUND 58,6
4420 SOUND 58,6
4430 SOUND 5,12
4440 RETURN
6000 CLS(3):SOUND128,2:SOUND128,
4:PRINT@37,"SINGLE DIGIT PROBLEM
S.";
6010 GOSUB 2000
6230 SC=0:P=0
6250 A1$=INKEY$
6260 A1=VAL(A1$)
6270 IF A1=4 THEN RETURN
6280 IF A1<1 OR A1>3 THEN 6250
6290 GOSUB 2090
6300 ON A1 GOSUB 6400,7000,7500
6380 GOTO 6000
6390 RETURN
6400 CLS(3):SOUND128,2:SOUND128,
4
6410 PRINT@101,"SINGLE DIGIT ADD
ITION.";
6420 X=RND(9):Y=RND(9)
6430 IF IN$="Y" THEN GOSUB 2200
6440 Z=X+Y
6445 XX$=" +"
6460 PRINT@160,TAB(16)X
6480 PRINTTAB(14)"+ "Y
6500 PRINTTAB(14)"-----":PRINT
6505 GOSUB 4000
6510 Z2$=INKEY$
6515 IF Z2$=CHR$(8) THEN Z1$=""
6520 IF Z2$=CHR$(8) THEN 6510
6525 Z1$=Z1$+Z2$
6530 Z1=VAL(Z1$)
6534 IF Z<0 THEN PA=274-LEN(STR$
(Z))
6535 IF Z=>0 THEN PA=275-LEN(STR
$(Z))
6536 PRINT@PA,Z1$
6537 IF Z<0 AND LEN(Z1$)=LEN(STR
$(Z)) THEN 6550
6538 IF Z>=0 AND LEN(Z1$)=LEN(ST
R$(Z))-1 THEN 6550
6545 GOTO 6510
6550 GOSUB 3000
6650 M$=INKEY$
6660 IF A1=3 AND M$="N" THEN RET
URN
6665 IF M$="N" THEN GOTO 6400
6670 IF M$="M" THEN RETURN
6680 GOTO 6650
6700 RETURN
7000 CLS(3):SOUND128,2:SOUND128,
```

COSMOS©
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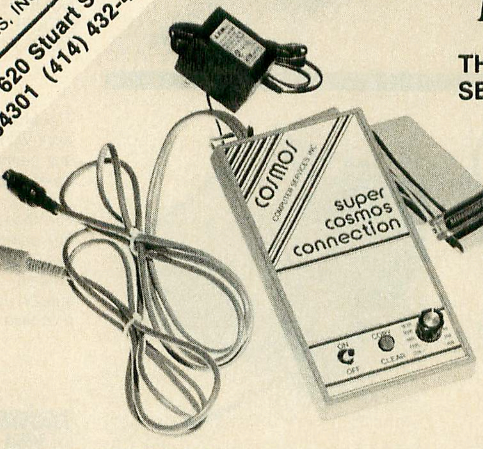

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```
:PRINT@100,"SINGLE DIGIT SUBTRA
TION";
040 Y=RND(9)
045 X=RND(9)
050 IF X<Y AND IN$="N" THEN GOT
 7045
055 IF IN$="Y" THEN GOSUB 2200
060 Z=X-Y
070 XX$=" -"
080 PRINT@160,TAB(16)X
100 PRINTTAB(14)"- "Y
120 PRINTTAB(14)"-----":PRINT
122 GOSUB 4000
125 Z2$=INKEY$
130 IF Z2$=CHR$(8) THEN Z1$=""
135 IF Z2$=CHR$(8) THEN 7125
140 Z1$=Z1$+Z2$:Z1=VAL(Z1$)
142 IF Z<0 THEN PA=274-LEN(STR$
Z)) ELSE PA=275-LEN(STR$(Z))
144 PRINT@PA,Z1$
145 IF Z<0 AND LEN(Z1$)=LEN(STR
(Z)) THEN 7150
146 IF Z>=0 AND LEN(Z1$)=LEN(ST
$(Z))-1 THEN 7150
147 GOTO 7125
150 GOSUB 3000
280 M$=INKEY$
300 IF A1=3 AND M$="N" THEN RET
RN
305 IF M$="N" THEN GOTO 7000
320 IF M$="M" THEN RETURN
340 GOTO 7280
360 RETURN
500 CLS(3):SOUND128,2:SOUND128,
:PRINT@103,"SINGLE DIGIT MIXED.
;
520 S=RND(2)
540 ON S GOSUB 6420,7040
542 IF M$="M" THEN RETURN
545 GOTO 7500
000 CLS(3):SOUND128,2:SOUND128,
:PRINT@37,"DOUBLE DIGIT PROBLEM
.";
010 GOSUB 2000
055 SC=0:P=0
060 A2$=INKEY$
070 A2=VAL(A2$)
080 IF A2=4 THEN RETURN
090 IF A2<1 OR A2>3 THEN 8060
095 GOSUB 2090
100 ON A2 GOSUB 8200,8800,9400
110 GOTO 8000
120 RETURN
200 CLS(3):SOUND128,2:SOUND128,
:PRINT@101,"DOUBLE DIGIT ADDITI
N";
220 X=RND(99):Y=RND(99)
222 IF IN$="Y" THEN GOSUB 2200
225 Z=X+Y
```

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THE COLOR COMPUTER MONTHLY MAGAZINE

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```
8230 XX$=" +"
8240 PA=178-LEN(STR$(X))
8242 PRINT@160,"":PRINT@PA,X
8250 PA=210-LEN(STR$(Y))
8255 PRINT@192,"":PRINT@PA-2,"+
"Y
8260 PRINTTAB(13)"-----":PRINT
8265 GOSUB 4000
8270 Z2$=INKEY$
8275 IF Z2$=CHR$(8) THEN Z1$=""
8280 IF Z2$=CHR$(8) THEN 8270
8285 Z1$=Z1$+Z2$:Z1=VAL(Z1$)
8290 IF Z<0 THEN PA=274-LEN(STR$
(Z)) ELSE PA=275-LEN(STR$(Z))
8295 PRINT@PA,Z1$
8300 IF Z<0 AND LEN(Z1$)=LEN(STR
$(Z)) THEN 8340
8310 IF Z>=0 AND LEN(Z1$)=LEN(ST
R$(Z))-1 THEN 8340
8320 GOTO 8270
8340 GOSUB 3000
8350 M$=INKEY$
8355 IF A2=3 AND M$="N" THEN RET
URN
8360 IF M$="N" THEN GOTO 8200
8370 IF M$="M" THEN RETURN
8380 GOTO 8350
8390 RETURN
8800 CLS(3):SOUND128,2:SOUND128,
4:PRINT@100,"DOUBLE DIGIT SUBTRA
CTION";
8820 Y=RND(99)
8830 X=RND(99)
8840 IF IN$="N" AND X<Y THEN8830
8845 IF IN$="Y" THEN GOSUB 2200
8850 Z=X-Y
8855 XX$=" -"
8860 PA=178-LEN(STR$(X))
8862 PRINT@160,"":PRINT@PA,X
8870 PA=210-LEN(STR$(Y))
8872 PRINT@192,"":PRINT@PA-2,"-
"Y
8880 PRINTTAB(13)"-----":PRINT
8885 GOSUB 4000
8890 Z2$=INKEY$
8895 IF Z2$=CHR$(8) THEN Z1$=""
8900 IF Z2$=CHR$(8) THEN 8890
8905 Z1$=Z1$+Z2$:Z1=VAL(Z1$)
8910 IF Z<0 THEN PA=274-LEN(STR$
(Z)) ELSE PA=275-LEN(STR$(Z))
8912 PRINT@PA,Z1$
8920 IF Z<0 AND LEN(Z1$)=LEN(STR
$(Z)) THEN 8950
8922 IF Z>=0 AND LEN(Z1$)=LEN(ST
R$(Z))-1 THEN 8950
8930 GOTO 8890
8950 GOSUB 3000
8960 M$=INKEY$
8965 IF A2=3 AND M$="N" THEN RET
```

```
URN
8970 IF M$="N" THEN 8800
8980 IF M$="M" THEN RETURN
8990 GOTO 8960
8995 RETURN
9400 CLS(3):SOUND128,2:SOUND128,
4:PRINT@103,"DOUBLE DIGIT MIXED"
;
9420 S=RND(2)
9430 ON S GOSUB 8220,8820
9432 IF M$="M" THEN RETURN
9435 GOTO 9400
10000 CLS(3):SOUND128,2:SOUND128
,4:PRINT@37,"TRIPLE DIGIT PROBLE
MS";
10010 GOSUB 2000
10055 SC=0:P=0
10060 A3$=INKEY$
10070 A3=VAL(A3$)
10080 IF A3=4 THEN RETURN
10090 IF A3<1 OR A3>3 THEN 10060
10095 GOSUB 2090
10100 ON A3 GOSUB 10200,10800,11
400
10110 GOTO 10000
10120 RETURN
10200 CLS(3):SOUND128,2:SOUND128
,4:PRINT@101,"TRIPLE DIGIT ADDIT
ION.";
10220 X=RND(999):Y=RND(999)
10225 IF X<10 OR Y<10 THEN 10220
10227 IF IN$="Y" THEN GOSUB 2200
10230 Z=X+Y
10235 XX$=" +"
10240 PA=178-LEN(STR$(X))
10245 PRINT@160,"":PRINT@PA,X
10250 PA=210-LEN(STR$(Y))
10255 PRINT@192,"":PRINT@PA-2,"+
 "Y
10260 PRINTTAB(12)"-------":PRIN
T
10265 GOSUB 4000
10270 Z2$=INKEY$
10275 IF Z2$=CHR$(8) THEN Z1$=""
10277 IF Z2$=CHR$(8) THEN 10270
10280 Z1$=Z1$+Z2$:Z1=VAL(Z1$)
10285 IF Z<0 THEN PA=274-LEN(STR
$(Z)) ELSE PA=275-LEN(STR$(Z))
10287 PRINT@PA,Z1$
10290 IF Z<0 AND LEN(Z1$)=LEN(ST
R$(Z)) THEN 10300
10295 IF Z>=0 AND LEN(Z1$)=LEN(S
TR$(Z))-1 THEN 10300
10297 GOTO 10270
10300 GOSUB 3000
10305 M$=INKEY$
10307 IF A3=3 AND M$="N" THEN RE
TURN
10310 IF M$="N" THEN GOTO 10200
10320 IF M$="M" THEN RETURN
10330 GOTO 10305
10340 RETURN
10800 CLS(3):SOUND128,2:SOUND128
,4:PRINT@99,"TRIPLE DIGIT SUBTRA
CTION";
10820 X=RND(999)
10830 Y=RND(999)
10840 IF IN$="N" AND X<Y THEN 10
830
10850 IF X<10 OR Y<10 THEN 10820
10852 IF IN$="Y" THEN GOSUB 2200
10855 Z=X-Y
10857 XX$=" -"
10860 PA=178-LEN(STR$(X))
10862 PRINT@160,"":PRINT@PA,X
10870 PA=210-LEN(STR$(Y))
10872 PRINT@192,"":PRINT@PA-2,"-
 "Y
10880 PRINTTAB(12)"-------":PRIN
T
10885 GOSUB 4000
10890 Z2$=INKEY$
10892 IF Z2$=CHR$(8) THEN Z1$=""
10895 IF Z2$=CHR$(8) THEN 10890
10897 Z1$=Z1$+Z2$:Z1=VAL(Z1$)
10900 IF Z<0 THEN PA=274-LEN(STR
$(Z)) ELSE PA=275-LEN(STR$(Z))
```

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```
10905 PRINT@PA,Z1$
10910 IF Z<0 AND LEN(Z1$)=LEN(ST
R$(Z)) THEN 10920
10912 IF Z>=0 AND LEN(Z1$)=LEN(S
TR$(Z))-1 THEN 10920
10915 GOTO 10890
10920 GOSUB 3000
10930 M$=INKEY$
10935 IF A3=3 AND M$="N" THEN RE
TURN
10940 IF M$="N" THEN 10800
10950 IF M$="M" THEN RETURN
10960 GOTO 10930
10970 RETURN
11400 CLS(3):SOUND128,2:SOUND128
,4:PRINT@103,"TRIPLE DIGIT MIXED
";
11420 S=RND(2)
11430 ON S GOSUB 10220,10820
11432 IF M$="M" THEN RETURN
11435 GOTO 11400
12000 X$=STR$(X)
12010 Y$=STR$(Y)
12015 WW$=" = "
12020 YY$=X$+XX$+Y$+WW$+Z1$
12030 AN=AN+1
12040 IF AN>50 THEN 14000
12050 WA$(AN)=YY$
12060 RETURN
13000 CLS
13010 PRINT@32,"TO PRINT OUT THE
 PROBLEMS THAT  HAD INCORRECT RE
SPONSES PLEASE  BE SURE THAT PAP
ER PRINTER IS   PROPERLY CONNECT
ED AND TURNED   ON.  WHEN YOU AR
E READY, PRESS  <ENTER> AND THE
PROBLEMS WITH   THE INCORRECT RE
SPONSE WILL BE  PRINTED."
13015 PRINT:PRINT"IF YOU WISH TO
 DO MORE PROBLEMS OR YOU DO NOT
WISH TO PRINT THE INCORRECT RESP
ONSES, PRESS <M>  AND THEN <ENTE
R> TO RETURN TO   MAIN MENU."
13020 INPUT RE$
13025 IF RE$="M" THEN RETURN
13030 PRINT#-2,"THESE ARE THE PR
OBLEMS THAT THE STUDENT"
13032 PRINT#-2,"ANSWERED INCORRE
CTLY. ALSO GIVEN ARE THE"
13034 PRINT#-2,"INCORRECT RESPON
SES THE STUDENT GAVE."
13036 PRINT#-2,"THESE PROBLEMS S
HOULD BE WORKED ON WITH"
13038 PRINT#-2,"THE INSTRUCTOR."
13040 PRINT#-2,"----------------
----------------------"
13042 PRINT#-2,"STUDENTS NAME  "
SN$
13044 PRINT#-2,"----------------
----------------------"
13050 FOR NA=1TOAN
13060 PRINT#-2,WA$(NA)
13070 NEXT NA
13075 IF AN=0 THEN PRINT#-2,"ALL
 THE PROBLEMS WERE ANSWERED CORR
ECTLY"
13080 AN=0:NA=0
13090 PRINT#-2,"----------------
----------------------"
13100 RETURN
14000 CLS
14010 PRINT"DUE TO THE MAXIMUM C
APACITY OF  THE STORAGE ARRAY, Y
OU MUST NOW PRINT THE INCORRECT
RESPONSES."
14020 INPUT "WHEN READY, PRESS <
ENTER>."RE$
14030 RETURN
32767 END
```

SIDE WISE OS9

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"The CBASIC Compiler"

Now anyone can create fast efficient Machine Language Programs Easily and Quickly without having to use an Editor/Assembler

CBASIC is a fully integrated, easy to use Basic program Editor and Compiler package. CBASIC is 99% syntax compatible with Disk Extended Color Basic programs, so most Basic programs can be loaded and compiled by CBASIC with little or no changes required. The compiler is an optomizing two-pass integer Basic compiler that can convert programs written in Disk Extended Color Basic into 100% pure 6809 Machine Language programs which are written directly to disk in a LOADM compatible format.

The programs generated by the compiler can be run as complete stand alone programs. A built-in linker/editor will automatically select one and only one copy of each subroutine that is required from the internal run-time library and insert them directly in the program. This eliminates the need for cumbersome, often wasteful separate "run-time" packages.

CBASIC WAS DESIGNED FOR BOTH BEGINNING & ADVANCED USERS

CBASIC is a Powerful tool for the Beginner or Novice programmer as well as the Advanced Basic or Machine Language programmer. The Beginner or Novice programmer can write and compile programs without having to worry about Stack Pointers, DP registers, memory allocation, and so on, because CBASIC will handle it for you automatically. All they have to do is write their programs using the standard Basic statements and syntax. For the advanced Basic and Machine Language programmers, CBASIC will let you take command and control every aspect of your program, even generating machine code directly in a program for specialized routines or functions.

CBASIC adds many features not found in Color Basic, like Interrupt, Reset, and On Error handling. It also has advanced programming features that allow machine level control of the Stack and Direct Page registers, variable allocation, automatic 64K RAM control, program origin and even multiple origins. It can even have machine language code generated within a program that executes just like any other Basic program line.

FULL COMMAND SUPPORT & SPEED

CBASIC features well over 100 Basic Commands and Functions that fully support Disk, Tape, Printer and Screen I/O. It also supports ALL the High and Low Resolution Graphics, Sound, Play and String Operations available in Extended Color Basic, and all with 99.9% syntax compatibility.

CBASIC is FAST. Not only will CBASIC compiled programs execute 10 to 1000 times faster than Basic, but the time it takes to develop a CBASIC program versus writing a machine language program is much, much shorter. A machine language program that might take several months to write and debug could be created using CBASIC in a matter of days or hours, even for a well experienced machine language programmer. We had a report from a CBASIC user that claimed "a Basic program that used to take 3 hours to run, now runs in 7 to 8 minutes". Another user reported a program that took 1 to 1½ hours to run in Basic, now runs in 5 to 6 minutes!!!

MORE THAN JUST A COMPILER

CBASIC has its own completely integrated Basic Program Editor. The Editor contained in CBASIC is used to Create and/or Edit programs for the compiler. It is a full featured editor with functions designed specifically for writing and editing Basic programs. It has built-in block Move and Copy functions with automatic program renumbering. Complete, easy to use inserting, deleting, extending and overtyping of existing program lines. It is also used for Loading, Saving, Appending (merging), Killing disk files and displaying a Disk Directory. It also has automatic line number generation for use when creating programs or inserting sequencial lines between existing lines. You can set the printer baud rate and direct normal or compiled listings to the printer for hard copy. The built-in editor makes program corrections and changes as easy as "falling off a log". If CBASIC finds an error when compiling, it points to the place in the program line where the error occurred. All you have to do is tell the editor what line you want to start editing and when it is displayed, move the cursor with the arrow keys to the place where the error is and correct it. Just like that, it's simple.

HI-RES & 80 COLUMN DISPLAYS

CBASIC is the only Color Basic Compiler that includes its own Hi-Resolution 51, 64 or 85 by 24 line display. It is also the only compiler that supports both the PBJ "Word-Pak" and the Double Density 80 column cards. All of these display formats are part of the standard CBASIC compiler package. Not only can these display formats be used for normal program editing and compiling, but CBASIC will also include them in your compiled programs! If you want CBASIC to include the display driver in your program, all you have to do is use a single CBASIC command "HIRES". The run-time display driver that CBASIC includes in your program is not just a simple display, but a full-featured display package. With the Hi-Resolution display package you can mix text & graphics, change characters per line, underline, character highlight, erase to end of line or screen, home cursor, home & clear screen, protect screen lines, and much more. All commands are compatible with our HI-RES II Screen Commander so you can easily develop screen layouts using HI-RES and Color Basic before you compile your program. The same applies to using the 80 column card drivers. What other Basic compiler offers you this kind of flexibility?

64K RAM SUPPORT

CBASIC makes full use of the power and flexibility of the 6883 SAM (Synchronous Address Multiplexer) in the Color Computer. It will fully utilize the 96K of address space available in the Color Computer (64K installed) during program Creation, Editing and Compilation. CBASIC has a special command for automatic 64K RAM control. When used in a program, it allows the user to use the upper 32K of RAM space automatically for variables or even program storage at run-time. It will automatically switch the ROMs in and out when needed. There are also two other commands that allow you to control the upper 32K of RAM manually, under program control. No other Color Basic compiler directly supports the use of 64K RAM like CBASIC.

ALL MACHINE LANGUAGE

CBASIC is completely written in fast efficient Machine Language, not Basic, like some other Color Basic compilers. Because of this, CBASIC can edit and compile very large programs. Even using the Hi-Resolution 51 by 24 line display, it can work with about a 34K program, and the 80 column card versions can handle almost 40K of program. Some of the other Basic compilers can only work with 16K or about 200 lines. Even working with large programs, CBASIC compiles programs with lightning fast speed. It will compile a 24K program to disk in less than 2 minutes! That's without a listing being generated. We've heard stories about some other compilers that take almost 10 minutes to compile a simple 2-3K program. You might inquire about this when you look at some of the other compilers available.

THE FINISHED PRODUCT

Since CBASIC contains statements to support ALL of the I/O devices (Disk, Tape, Screen & Printer), Hi-Res Graphics Sound, and Enhanced Screen displays, it is well suited for a wide range of programming applications. It generates complete, Ready to Run machine language program. The finished product or program does not have to be interfaced t a Basic program to perform some of its functions or commands. This may seem obvious to you, but some of the othe Color Basic compilers don't necessarily work this way. Some of their compiler commands need a separate Basic prograr in order for them to work. In some cases, require that a separate Basic program be interfaced to the compiled prograr to perform I/O functions, like INPUT, PRINT and so on. CBASIC doesn't do this. ALL of its commands are compile into a single machine language program that does not require any kind of Basic program to make it work.

COMPATIBILITY

You may be wondering about those statements we made earlier concerning 99% or 99.9% syntax compatibility. Wha does that other 1% consist of? The biggest part of that 1% has to do with string arrays and variables. CBASIC does no use a "String Pool" like Color Basic. It uses absolute memory addresses to locate string variables and arrays. This is wh CBASIC's string processing is so fast, it also eliminates the time consuming "Garbage Collection" problem. When CBASI allocates space for strings, it must know how much space to use for each string. When you Dimension a string variabl in CBASIC, you must tell it how much space you want to save for each element. To Dimension an array of 40 string 64 characters each, you would DIM DA$(40,64). If a string is not dimensioned, CBASIC will automatically allocate 3 bytes for it. If you want a single string to have enough room for 200 characters you would DIM AX$(200). For strin arrays, you would still access the element you want, the same as Color Basic, to get string #30 from the array DA$, yo would still use DA$(30), the only real change is in the DIM statement. For undeclared string arrays of 10 elements c less, CBASIC will automatically reserve space for 10 (0-9) strings of 32 characters. In some other Color Basic compiler you have to declare EVERY string variable used in the progrm in a DIM statement. And, to create an array of 40 strinc with 64 characters each, you would have to DIM AD$(2560), and then to access string #30, you would have to multipl 30 × 64 and use a special variable name format or access it one character at a time. Not very compatible or convenier to use, and difficult at best.

CBASIC REQUIREMENTS

CBASIC requires a minimum of 32K RAM and at least one Disk drive. We strongly recommend that you have 64K CBASIC is compatible with all versions of Color & Extended Basic and both Disk Basic V1.0 and V1.1. Prograr compiled on either system will run on systems with different ROMs. CBASIC is NOT compatible with JDOS.

DOCUMENTATION

The Documentation provided with any program is very important to the user. This is especially true when you ta about a program as complete and complex as CBASIC. Even though CBASIC was designed to be the most User Frienc compiler on the market, we went to great lengths to provide a manual that is not only easy to use and understand, b comprehensive and complete enough for even the most sophisticated user. The manual included with CBASIC consi of approximately 120 pages of real information, not like some manuals that put just one or two short paragraphs on page. If we did it that way, we could have easily created a three or four hundred page manual. The manual index brea down each section of the manual and gives a 3 or 4 word description of each section and its items along with pa numbers. The manual has three sections, the Editor, Compiler and Appendix. Each of these is divided into subsectior with Section and Subsection titles printed at the top of each page. If you want to, you could find the information you a looking for by simply flipping through the pages and scanning the Section titles on the top of the pages. The Manual its is an 8½ by 11 Spiral Bound book with durable leather textured covers. Some of the reports we have had from CBAS users describe the manual as being the Best program manual they have ever used.

COMPARE THE DIFFERENCE

CBASIC is not just another Color Basic Compiler. It is the only complete Basic Compiler System for the Color Compute Compare CBASIC's features to what other compilers offer and you'll see the difference. When comparing CBASIC other compilers, you might want to keep some of these questions in mind. Does it support I/O functions? You can't wri much of a program without PRINT, INPUT and so on. What about complex string statements, or string statements at a How large of a program can you write? Can you compile a complex string like: MID$(RIGHT$(DA$(VAL(IN$),LEN(LE$)),3,3 Can you use two character variable names for string & numeric variables, like Basic. Does it support all the Hi-Res graphi statements including PLAY, DRAW, GET and PUT, using the same syntax as Basic? Do you ever have to use a separa Basic program? Can you take complete Basic programs and compile them without extensive changes? Will they wor How do you edit a program when it has errors compiling?

PRICE VERSUS PERFORMANCE

The price of CBASIC is $149.00. It is the most expensive Color Basic Compiler on the market, and well worth tl investment. We spent over 2 years writing and refining CBASIC, to make it the Best, most Compatible Color Ba compiler available. Most of our CBASIC users already bought one or more of the other compilers on the market ar have since discarded them. We even traded in a few of them. If you want a cheap compiler, we'll sell you one of tho traded in, at a good price. Before you buy a compiler, compare the performance of CBASIC against any Color Ba compiler. Dollar for Dollar, CBASIC gives you more than any other Color Basic compiler available.

ORDERING INFORMATION

To order CBASIC by mail, send check or money order in the amount of $149.00 plus $3.(for shipping and handling to the address listed below.

To order by VISA, MASTERCARD or COD, call us at: (702) 452-0632 (Monday thru Saturday, 8am to 5pm PST

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16K
ECB

Keep up with the pace in this reptile race

Sidewinding Skirmishes With Video Vipers

By Robert E. Rice

Simple in concept and playable by young children (although Mom and Dad will get a kick out of it), *Snake Chase* is loosely based on the game *Colorful Maneuvers* by James Wood. Two snakes, under control of the ight and left joysticks, scurry about the creen leaving ever-growing trails in heir wake. The game ends when one of he snakes attempts to run over either ne of the trails or the screen border. Scoring is updated and displayed by name after each round.

Only 3.6K in length, *Snake Chase* uns on the smallest of CoCos. It is fully playable on non-Extended BASIC mahines, but lines 60 and 390 will have to be changed to:

```
60 IF INKEY$="" THEN 60 ELSE
FOR Q=1 TO 1500:NEXT Q

390 CLS8:A$="":V=70:C$=CHR$
(159):FORQ=1 TO 31:C1$=C1$+C$:
NEXTQ:C2$=C$+C$
```

Also, change the words EITHER FIREBUTTON in Line 720 to read ANY KEY. This allows the game to be started using a key press (followed by a three-second delay) instead of the firebutton.

The `POINT` function is used in lines 110 and 160 to determine the existence of a trail or border (test for "pixel on"). In this way, a player can lose when running over his own trail as well. This precludes the chance of a stalemate by not allowing players to continually back up over the top of themselves.

Despite the use of the slow `SET/RESET` graphics, the game tends to move along quite rapidly. Too quickly, it turned out, for my children to keep up with. Line 730 offers the option of a fast or slow speed. The speed of either mode can be adjusted by varying the value of 'S' in Line 740. 'S' is used to establish the delay duration for successive snake movements in Line 180.

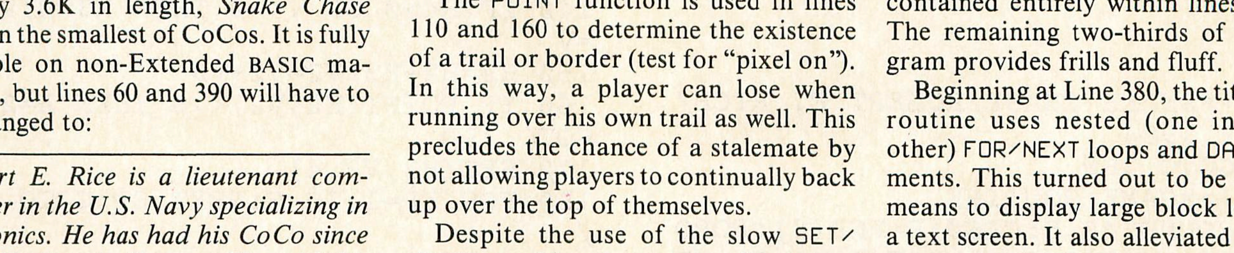
Once motion has begun, the snakes continue in those directions until instructed to do otherwise. This holds true even when the joysticks are neutralized. Variables H0, H3, V0 and V3 keep track of this activity.

As you can see, the game itself is contained entirely within lines 30-330. The remaining two-thirds of the program provides frills and fluff.

Beginning at Line 380, the title screen routine uses nested (one inside the other) `FOR/NEXT` loops and `DATA` statements. This turned out to be a simple means to display large block letters on a text screen. It also alleviated the need to type `CHR$` 180 times. The screen was first laid out on a standard page of `PRINT@` locations copied from the

---

Robert E. Rice is a lieutenant commander in the U.S. Navy specializing in lectronics. He has had his CoCo since 983. He lives in Tampa, Fla. with his wife, Pam, and their children, Nikki and Matt.)



CoCo manual. That information was then transposed into the respective block graphics codes and placed in DATA statements in lines 460-540. Each DATA line corresponds to one full printed line of 20 graphics blocks. The FOR/NEXT loop in Line 420 reads the data, converts them to CHR$ and consolidates them into A$. Lines 410 and 430 control the sequence of data reads and PRINTing positions for A$.

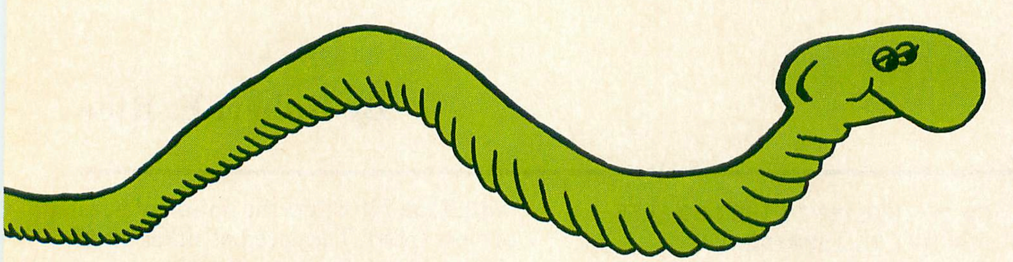
The music, lines 560-590, plays the familiar snake charmer's tune using the SOUND command. This technique greatly simplified the process of transposing the tune into corresponding SOUND values. With the CoCo manual as a reference, I wrote the note values on top of the keys of my daughter's toy organ. While pecking out the melody, I wrote down the values as I went, storing them in DATA statements. The data is arranged with tone and duration values adjacent. Since the data is read note by note with a FOR/NEXT loop (Line 560), there is sufficient delay in processing to keep identical adjacent tones from blending together. The results are every bit as good as can be produced by Extended Color BASIC's PLAY command. This method also save a lot of typing.

Variables	Function
E	Miscellaneous
Q	FOR/NEXT loops
H1, V1, H2, V2	Direction of snake head movements
H0, H3, V0, V3	Snake head motion
H, V	Read joystick positions
S, SP	Control speed of game
C1$, C2$	Text borders
R, L	Player scores
R$, L$	Player names
A	Identifies winner
A$	Housekeeping

Due to the "straight through" desig of the program, the only subroutin needed is the one that draws the borde around text screens. Two multicharacter graphics strings (C1$ and C2$) ar formed in Line 390. The border subroutine itself resides in lines 340-370. I prints C1$ at the top and bottom of th screen. C2$ is printed along the far righ border with a FOR/NEXT/STEP loop This forces a screen wrap-around tha places half of C2$ on each edge of th screen. PRINTing to the last scree position would cause a line feed for th entire screen; this is why C1$ is only 3 characters long.

The POKE in Line 360 puts the sam information into that block of scree RAM without scrolling the image. B changing the STRING$ and POKE values you can create a border using an available graphics or alphanumeri character with equal ease. Variables wi also work. Try swapping them out to se what happens.

Feel free to "hack" away at thi program, modifying and improving it t your own tastes. If you find som techniques here that you like, jot then down for ready reference in the future.



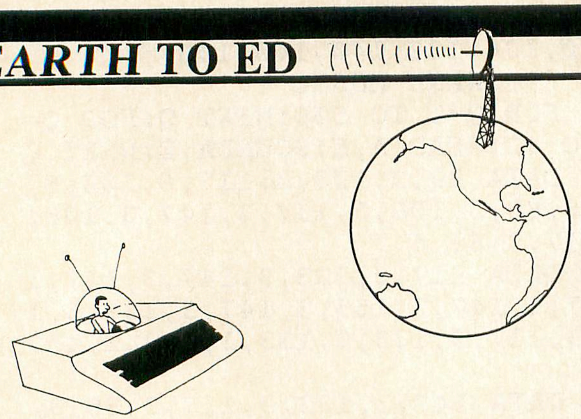
The listing: SNKCHASE

180	241
340	134
500	31
630	70
END	178

```
0 '**SNAKE CHASE/ROBERT E. RICE/
JUNE 1984
10 GOTO 380
20 '**GAME ROUTINE
30 SOUND240,5:CLS0:E=RND(8):FORQ
=0TO63:SET(Q,0,E):SET(Q,31,E):NE
XTQ
40 FOR Q=0TO31:SET(0,Q,E):SET(63
,Q,E):NEXTQ
50 H1=46:V1=3:H2=15:V2=28:SET(H1
,V1,3):SET(H2,V2,4)
60 E=PEEK(65280):IF E=255 OR E=1
27 THEN 60
70 H0=0:V0=1:H3=0:V3=-1
80 H=SGN(INT((JOYSTK(0)-5)/58)):
V=SGN(INT((JOYSTK(1)-5)/58))
90 IF H<>0 OR V<>0 THEN H0=H:V0=
V
100 H1=H1+H0:V1=V1+V0
110 IF POINT(H1,V1)<>0 THEN A=1:
GOTO 190
120 SET(H1,V1,3)
130 H=SGN(INT((JOYSTK(2)-5)/58))
:V=SGN(INT((JOYSTK(3)-5)/58))
140 IF H<>0 OR V<>0 THEN H3=H:V3
=V
150 H2=H2+H3:V2=V2+V3
160 IF POINT(H2,V2)<>0 THEN A=2:
GOTO 190
170 SET(H2,V2,4)
180 FOR SP=1 TO S:NEXT SP:GOTO 8
0
190 '**WIN/LOSE ROUTINE
200 SOUND10,10
210 IF A=2 THEN 230
220 FOR Q=1TO25:RESET(H1,V1):SOU
ND200,1:SET(H1,V1,3):SOUND240,1:
NEXT Q:GOTO 240
230 FOR Q=1TO25:RESET(H2,V2):SOU
ND200,1:SET(H2,V2,4):SOUND240,1:
NEXT Q
240 FOR Q=1TO1000:NEXT Q
250 CLS3:GOSUB 340:IF A=1 THEN P
```

```
RINT@173-LEN(L$)/2,L$" WINS!";:L
=L+1 ELSE PRINT@173-LEN(R$)/2,R$
" WINS!";:R=R+1
260 FOR Q=1TO1500:NEXT Q
270 PRINT@298,"TOTAL WINS:";:PRI
NT@365-LEN(L$)/2,L$"="L;:PRINT@4
29-LEN(R$)/2,R$"="R;
280 FOR Q=1TO1500:NEXT Q
290 PRINT@42,"PLAY AGAIN?";:SOUN
D240,1
300 A$=INKEY$:IF A$="" THEN 300
310 IF A$="N" THEN PRINT@11,"<<
BYE >>";:SOUND190,3:FOR Q=1 TO 2
000:NEXT Q:END
320 IF A$<> "Y" THEN 300
330 GOTO 30
340 PRINT@0,C1$;
350 FORQ=31 TO 479 STEP32:PRINT@
Q,C2$;:NEXT Q
360 PRINT@480,C1$;:POKE1535,159
370 RETURN
380 '**TITLE SCREEN
390 CLS8:A$="":V=70:C1$=STRING$(
31,159):C2$=STRING$(2,159)
400 GOSUB 340
410 FOR Q=1 TO 9
420 FOR E=1 TO 20:READ A:A$=A$+C
HR$(A):NEXT E
430 PRINT@V,A$;:A$="":V=V+32
440 NEXT Q
450 PRINT@425,"ROBERT E. RICE";:
GOTO560
460 DATA 133,140,140,136,133,130
,128,138,128,134,137,128,133,128
,129,136,133,140,140,136
470 DATA 133,131,131,130,133,133
,130,138,133,131,131,138,133,131
,136,128,133,131,130,128
480 DATA 128,128,128,138,133,128
,137,138,133,128,128,138,133,128
,137,128,133,128,128,128
490 DATA 132,140,140,136,132,128
,128,136,132,128,128,136,132,128
,128,136,132,140,140,136
500 DATA 128,128,128,128,128,128
,128,128,128,128,128,128,128,128
,128,128,128,128,128,128
510 DATA 133,140,140,138,133,128
,128,138,128,134,137,128,133,140
,140,136,133,140,140,136
520 DATA 133,128,128,128,133,131
,131,138,133,131,131,138,133,131
,131,130,133,131,130,128
530 DATA 133,128,128,130,133,128
,128,138,133,128,128,138,128,128
,128,138,133,128,128,128
540 DATA 132,140,140,136,132,128
,128,136,132,128,128,136,132,140
,140,136,132,140,140,136
550 '**SNAKE MUSIC
560 FOR Q=1 TO 500:NEXT Q:FOR Q=
1 TO 42:READ A,E:SOUNDA,E:NEXT Q
570 DATA 89,3,108,3,117,6,108,6,
89,6,89,3,108,3,117,3,147,3,108,
3,117,3,89,6
580 DATA 117,3,133,3,147,3,147,1
,147,1,147,3,153,3,147,3,133,3,1
08,3,117,3,133,3,133,1,133,1,133
,3
590 DATA 147,3,133,3,117,3,89,3,
108,3,117,6,108,6,89,6,89,3,108,
3,117,3,147,3,108,3,117,3,89,10
600 '**INTRO
610 CLS3:GOSUB 340:FOR Q=1TO500:
NEXT Q
620 PRINT@68,"NAME OF PLAYER ON
LEFT?";:PRINT@300,"";:LINEINPUT
L$:SOUND190,2
630 CLS3:GOSUB 340:FOR Q=1 TO 50
:NEXT Q:PRINT@68,"NAME OF PLAYER
 ON RIGHT?";:PRINT@300,"";:LINEI
NPUT R$:SOUND190,2
640 CLS3:GOSUB 340:PRINT@164,"DO
 YOU WANT INSTRUCTIONS?";
650 PRINT@269,"y OR n";
660 A$=INKEY$:IF A$="" THEN 660
ELSE IF A$<>"Y" THEN 730
670 CLS4:PRINT@32,"  EACH PLAYER
 HAS A SNAKE. TO     WIN, YOU MU
ST KEEP YOURS        MOVING WITH
OUT BUMPING INTO     ANY LINES."
680 PRINT:PRINT"  YOU CAN TRY TO
 BLOCK THE        OTHER SNAKE WI
TH YOURS."
690 PRINT@422,"<ANY KEY FOR MORE
>";:GOSUB 340
700 IF INKEY$="" THEN 700
710 CLS4:PRINT@32,"  THE JOYSTIC
K CONTROLS THE       DIRECTION O
F YOUR SNAKE."
720 PRINT:PRINT"  WHEN YOU SEE T
HE SNAKE HEADS,   PRESS EITHER f
ire button TO     START THE GAME
."
730 PRINT@358,"DO YOU WANT TO PL
AY";:PRINT@389,"FAST OR SLOW (f
OR s)";:GOSUB 340
740 A$=INKEY$:IF A$="F" THEN S=1
 ELSE IF A$="S" THEN S=50 ELSE G
OTO 740
750 GOTO30
760 '******SNAKE CHASE*******
770 '*****ROBERT E. RICE*****
780 '**15910 WOODPOST PLACE**
790 '****TAMPA, FL 33624*****
800 '*******JUNE 1984********
```

EARTH TO ED



The Banana Serial Continues

By Ed Eller
Rainbow Technical Edito

• *I purchased a Gorilla Banana printer from DAK Industries and had the same problem with a Radio Shack cable that Bob Hart asked about in your November 1985 column.*

DAK sells the correct cable along with a new ROM chip to adapt the Banana to run on the CoCo. Hope this solves Bob's problem.

Morton Foster
Stuart, FL

Typing Troubles

• *I recently bought a Panasonic RK-P400C typewriter thinking that it would connect to the serial port of my CoCo. It needs an RS-232 interface cable. I tried Radio Shack's cable but it did not seem to work. Maybe you can tell me how I can get one.*

Terry O'Brien
Baltimore, MD

Radio Shack's four-pin to 25-pin cable is designed for use with a modem; connections for a printer are very different, and since the plugs are molded in place you can't modify this cable.

You can make a new cable with a four-pin DIN plug, a DB25 male plug and some four-conductor cable such as telephone wire. Connect Pin 2 on the four-pin plug to the pin on the DB25 your printer uses to indicate that the printer is ready (often Pin 20). Connect Pin 4 to the pin used to receive data from the computer (often Pin 3). Connect Pin 3 on the DIN plug to Pin 7 on the DB25.

Rationalizing Printers

• *I have a Tandy DMP-110 printer that has a rather frustrating trait: when dumping any kind of graphics screen, the printout has very different proportions than what actually appears on the screen.*

Andre Egli
Sherbrooke, Quebec

Since you didn't send a sample I'm not sure what your printer is actual doing, but some printers will pri graphics screens half as wide as the should be. To correct this, send out t printer commands to switch to e panded print mode before you start screen dump.

Wider Screens

• *Is it possible to get a device that w give an 80-column display? Would it b possible to use this with my 13-inc Sony color monitor?*

Agnes M. Smi
San Diego, C

There are boards for the CoCo, suc as PBJ's *Word-Pak*, that give an 8 column display on the CoCo. The work by adding an entirely new vide display circuit the CoCo can acce separately. I'm not sure if such a boa will work with your Sony, since I don know which model it is; these boar work best on a good monochrom monitor.

(Ed Ellers, a RAINBOW and PCM staff member, is a self-confessed electronics fanatic whose other interests include science fiction.)

Colorless PMODE 4 Graphics

I own one of the old gray CoCos, and any program that uses PMODE 4 *causes the screen to go black and white. It doesn't matter whether my old Sears 19-inch color TV or my new RCA ColorTrak 2000 is connected. I am suspicious of the Extended BASIC ROM, but before I purchase a new one I would like your suggestions.*

W.C. Alexander
Dallas, TX

Oddly enough, I have had the same problem with my home setup, which includes an RCA ColorTrak 2000 TV. I'm not familiar with the Sears TV you mention, but RCA's sets are well-designed and I seriously doubt the TV would cause this problem. The best information I have is that the earlier CoCos had some idiosyncrasies that caused the color burst signal to be somewhat weak, and your sets may be unable to lock in on it. If you're familiar with TV set circuitry, you might try adjusting the color killer control (on present RCA sets there's a Chroma Level control that has a similar function) to make the color signal snap in.

CoCo, Meet PC

I have been attempting to send text written on Telewriter-64 *from my CoCo via modem to a friend's IBM PC without success. I have used both* Colorcom/E *and* CC Modem*; neither of these seem to work, and my friend cannot receive the text. I have consulted with several people — one tells me that* Telewriter-64 *files cannot be converted to ASCII, and another says that* CC Modem *can only be received by another CoCo running* CC Modem.

My questions are:

1) Can Telewriter-64 *files be saved in ASCII?*

2) Can CC Modem *be used on my computer with another terminal program on the PC?*

3) How can I convert BASIC to ASCII?

M.L. Wilkinson
Miami, FL

Telewriter-64 files can be saved on disk in ASCII by entering the binary disk I/O menu, pressing 'B' to get into BASIC, then entering `RUN "S/ASC"`. This will get you to the ASCII disk I/O menu, which will save the text in ASCII.

I'm not familiar with *CC Modem*, but *Colorcom/E* should work in this application. Check with your friend to see that the settings in his terminal program (seven or eight bits, parity, etc.) are the same as yours. For transferring ASCII files, the usual settings are seven bits, even parity and one stop bit.

Saving BASIC programs on disk in ASCII is done by entering the command `SAVE"filename",A`. This same command works both on the CoCo and the IBM PC.

One-Liner Contest Winner . . .

10XDUMP is a one-line screen dump program for the Star Micronics Gemini-10X, Gemini-15X, SG-10 and SG-15 printers. The program is designed to turn the screen sideways and double the 'X' and 'Y' coordinates to give an enlarged printout.

The listing:

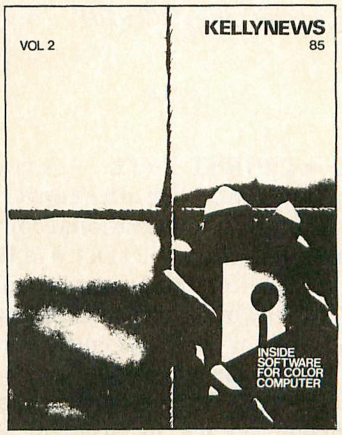
```
1000 PRINT#-2,CHR$(27);CHR$(51);
CHR$(11);:FORX=0TO256STEP3:PRINT
#-2,CHR$(27);"K";CHR$(128);CHR$(
1);:FORY=191TO0STEP-1:V=PPOINT(X
,Y)*192+PPOINT(X+1,Y)*48+PPOINT(
X+2,Y)*12:FORZ=1TO2:PRINT#-2,CHR
$(V);:NEXTZ:NEXTY:PRINT#-2,CHR$(
13);:NEXTX:PRINT#-2,CHR$(30)
```

Chuck Wollert
Houston, TX

(For this winning one-liner contest entry, the author has been sent copies of both *The Second Rainbow Book Of Adventures* and its companion *The Second Rainbow Adventures Tape.*)

Important !

If you live in Canada and you own a Color Computer, you should have a copy of our latest Catalog. We distribute most of the software available for the Color Computer. Our Catalog also contains articles, reviews, and tips for the Canadian COCO user. We are also avid OS-9 and hard drive users.



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PIPELINE

BLACK GOLD — Automated Office Products, a computer supply company, has launched a campaign to alert the business community to the practical advantages of saving and reloading their printing cartridge cases.

AOP claims offices can save up to 60 percent of the cost of a new ribbon by having their old ones professionally reloaded. Vice President Bill Anderson said reloading can be done for almost any printing ribbon used today on any printer, typewriter or calculator. He also cautions businesses against using re-inked cartridges because of reduced printing quality.

AOP expects 60 percent of its $1 million in sales this year to come from reloading 120,000 ribbon cartridges and spools for more than 60 companies, trade associations and government agencies in the United States and Europe.

Write: *Automated Office Products, 6218 Baltimore Ave., Riverdale, MD 20737 or call (301) 927-9101.*

* * *

LOVE AT FIRST BYTE — A couple who first met in March after conversing three months via a recreational computer network were married Oct. 4 in Palos Park, Ill. The ceremony was broadcast "live," by way of a computer transcript, to thousands of computer enthusiasts in the U.S. and abroad.

Pamela Ann Falejczyk of Chicago first made contact, by accident, with Mark Crosby of Dallas last January via People/Link, a videotex network devoted entirely to recreational use. Falejczyk and Crosby — or Panda and Azure as they're respectively known on People/Link — met face to face three months later in Dallas.

Crosby, 31, is an engineer, while the 25-year-old Falejczyk works for a computer research firm.

People/Link is a service of American Home Network Inc., which is based in Arlington Heights, Ill.

* * *

HANDY TANDY — Thousands of children in hundreds of school districts across the country are getting their introduction to computers via the Color Computer, the Tandy Corporation says.

Schools have selected the Color Computer because of the low cost, easy use and the more than 500 education software titles. Radio Shack support and easy expandability have also made the Color Computer a popular item in elementary schools. Almost a half million school teachers have been trained in free educators' workshops offered by Tandy.

The Color Computer also offers schools the option of establishing shared learning networks, in which student work stations are linked to a teacher's host computer.

* * *

HOLD THE LINE — Personal computers can now control graphics presentations, such as slides and drawings, at different locations on a telephone conference call with new software introduced by AT&T.

AT&T Truevision Still-Frame Teleconferencing Software (*STS*) allows sending of digitized electronic photographs over ordinary telephone lines at transmission speeds up to 9600 Baud. The system lets any action on the monitor at one teleconference location appear simultaneously at another. Its primary functions are: controlling an electronic "slide show" on screens at both conference sites; pointing to items on local and remote screens simultaneously using the computer cursor; annotating local and remote screens simultaneously with text, graphics or numbers; and capturing an image from a video source at one location and transmitting it to another.

STS works with AT&T's PC 6300 and other compatible personal computers.

Write: *AT&T, Electronic Photography and Imaging Center, 202 Wellesley Blvd., Indianapolis, IN 46219, or call (317) 352-6120.*

* * *

DEALS ON WHEELS — Sam Paryzer, a salesman for PRO Computer Systems, has found a unique way of reaching his prospects — a 30-foot-long motor home.

The motor home is packed with hardware, software, special generators to provide the large amount of power he needs to run the equipment, and two air conditioners — a necessity in his South Florida sales territory. That's a total investment of $80,000, excluding the motor home.

Paryzer says the mobile sales office allows him to better serve his customers.

* * *

DUM-DEE-DUM-DUM — The CompuServe Information Service is now offering biographies and high resolution graphics pictures of the fugitives who appear on the FBI's 10 Most-Wanted List.

These graphics can be received by only those subscribers with an IBM personal computer or a compatible computer. Those with other persona computers must download them and then view them.

CompuServe is based in Columbus Ohio, and provides information and communication services to more than 230,000 personal computer users.

* * *

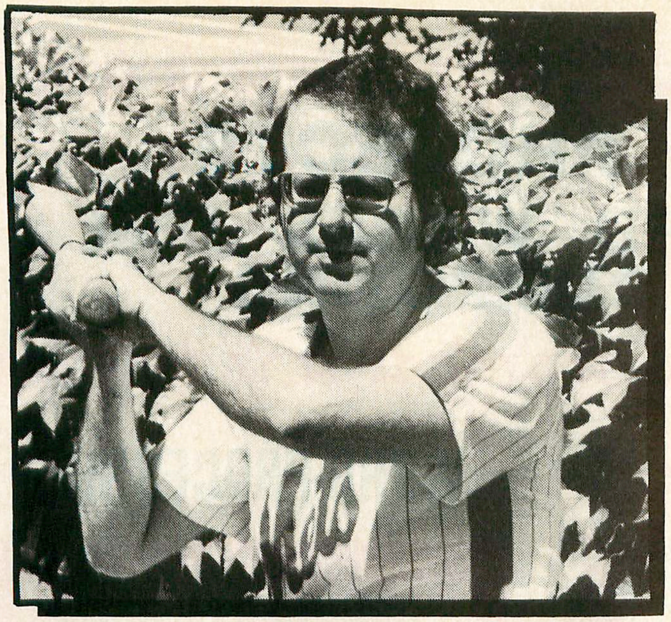
ALPHA NEW TWO — Alpha Electronics, a designer and supplier of advanced computer peripheral kits and accessories, has issued two new products: the Ultimate Printer Stand and the BufferLink.

The Ultimate Printer Stand, which is designed for those who use more than one type of paper or forms, offers two removable shelves to allow convenient loading and storage of up to three different papers or forms. The stand is made of clear Plexiglas and weighs five pounds.

BufferLink is a printer buffer that accepts both parallel and serial data from a computer and sends the data to a parallel or serial printer with 63,232 bytes of RAM buffer in between. BufferLink interfaces with the Color Computer via the user I/O port, allowing use of a standard printer. It is sold only in kit form and requires assembly skills of an advanced builder.

Write: *Alpha Electronics, P.O. Box 1005, Merritt Island, FL 32952 or cal (305) 453-3534.*

* * *



- CoCo Legends Collection - Bob "Whiffle" Rosen

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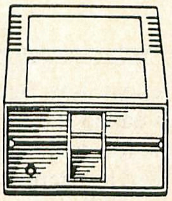

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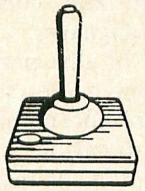

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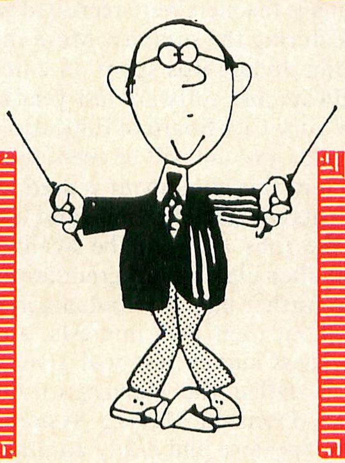

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Preparing For The Right Career Choice

By Steve Blyn
Rainbow Contributing Editor

Career education is a topic that is rapidly gaining in popularity in many schools. The choice of one's future occupation is becoming increasingly complex.

As new technology replaces older jobs, it also creates new ones. Today we see more and more job titles than we have ever seen before. Advances in robotics are a fine example of this phenomena. Robots are indeed replacing many workers. The automobile industry is especially affected by robots. The new jobs of robot technician and repairperson as well as robot "watchers" are now available for the displaced workers.

It is becoming more difficult to keep track of and inform students of the career choices facing them. New York City is the largest school system in the country. A major move to increase career awareness has been instituted this year. It is called the Regents Action Plan. It calls for a new emphasis on teaching career awareness, shops with modern trade skills, computer literacy and foreign languages.

The hope of this plan is to better prepare the one-million students in New York City for future employment. Their Board of Education is very serious about this plan. Many new foreign language teachers were recruited worldwide during the summer. More than 10 million dollars was spent on computer hardware and software last year by the New York City Board of Education, and a similar amount will be spent this year. Much of this equipment is used to give students some background and training for the jobs that will be available to them after high school graduation.

To further help the students in learning about their own interests, a career awareness survey test was given. This test is called the Harrington-O'Shea Career-Decision Making System. It is an inexpensive and easily administered test. The survey is in two parts. In part one, a large chart helps explain job definitions to the students. Several hundred typical jobs are listed and classified. Part two consists of a 120-question survey that attempts to focus in on student interests.

A self-scoring method is provided to show the student which areas to consider. Careers are broken up into six main categories: crafts, scientific, the arts, social, business and clerical jobs. A further breakdown of jobs within the student's primary interest area is then determined by the test. Specific career choices can, therefore, be suggested to each student.

This test is not only useful in making future career choices; it is primarily used by New York City to help the students initially make a wise choice on a high school. There are many specialized high schools in the city and also special programs available in the regular high schools. This test helps students make an intelligent decision about which high school programs to apply for.

This month's program deals with careers on a beginner's level. The program asks students to match jobs with their descriptions. As written, the material is on a level for younger children.

Youngsters are usually taught about careers through the study of community helpers. They often go on field trips to visit the local firehouse, police station,

(Steve Blyn teaches both exceptional and gifted children, holds two master's degrees and has won awards for the design of programs to aid the handicapped. He owns Computer Island and lives in Staten Island, N.Y.)

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bank and other neighborhood places. Parents are sometimes invited to speak to the class to explain other types of jobs. As children grow older, their fund of career knowledge should expand through other contacts.

We hope you will change our data to suit your needs. For young children, it is a good idea to make several versions of the program. The extra versions can include different sets of community workers. There is, of course, no need to retype the program to make different versions. Run the original, list it, replace the data and save your new version. Older children can benefit by sets of data that describe a wider, more technical range of career choices.

The data comes in sets of 12 items. This amount was used because 12 job titles format well on the CoCo's screen. We always want our programs to format well so they are attractive and help hold the interest of the students.

Line 60 reads the 12 job descriptions (A$) and the 12 job titles (B$). Line 100 selects a random job description to be matched up by the user with the correct job title. Lines 130-210 print out these job titles. Line 220 gets the student's answer. Line 250 checks to see if the answer is a valid choice. If not, the answer is erased and another try is given. Line 240 is the escape. If 'E' is pressed as a response to any question, the program ends. This is a nicer way of exiting the program than merely pressing the BREAK key. Lines 260-310 underline the student's answer. This serves to further reinforce the student's control of and interest in the prograr He sees which number he pressed as we as his answer underlined. Lines 320-33 tell the student whether he is right o wrong. If incorrect, the same questio is repeated until answered correctly.

We felt there was no reason for formal scoring in this program. I should not be looked upon as a test. I should be used until mastered. We hop you use and modify this program t your child's needs. We at Compute Island are always interested in the use of the programs that appear in thi monthly column. If you have any ques tions or comments, you may write to u at 227 Hampton Green, Staten Islanc NY 10312, phone (718) 948-2748. Pleas enclose an SASE when writing if yo wish a reply.

220 189
END 251

The listing: COMMHELP

```
10 REM"COMMUNITY HELPERS"
20 REM" STEVE BLYN,COMPUTER ISLA
ND,NY
30 XX=RND(-TIMER)
40 DIM A$(12),B$(12)
50 FOR T=1 TO 12
60 READ A$(T),B$(T):NEXT T
70 K$=STRING$(7,195)
80 G$=STRING$(32,204)
90 H$=STRING$(32,195)
100 X=RND(12)
110 CLS5
120 PRINT@ 0,G$;
130 PRINT@32,A$(X)
140 PRINT@64,H$;
150 PRINT@128,STRING$(32,239);
160 PRINT@192,"1. PILOT  2. WAIT
ER  3. BARBER"
170 PRINT@256,"4. COOK   5.SALES
MAN 6. NURSE"
180 PRINT@320,"7.FIREMAN 8.TEACH
ER  9.MECHANIC"
190 PRINT@384,"10.JANITOR11.TYPI
ST 12. POLICE"
200 PRINT@96," "
210 PRINT@96,"      WHICH IS MY
JOB ? ";
220 LINE INPUT N$
230 SOUND 200,2
240 IF N$="E" THEN CLS:END
250 IF VAL(N$)>0 AND VAL(N$)<13
THEN 260 ELSE 200
260 S=VAL(N$)
270 R=S*11-11
280 IF S>3 AND S<7 THEN R=R+32
290 IF S>6 THEN R=R+63
300 IF S>9 THEN R=R+31
310 PRINT@225+R,K$;
320 IF S=X THEN PRINT@459,"CORRE
CT !";:PLAY"L15ABCABCABC":FOR T=
 1 TO 1500:NEXT T:RUN 10
330 IF S<>X THEN PRINT@448,"PLEA
SE PRESS ENTER TO TRY AGAIN.";
340 EN$=INKEY$
350 IF EN$=CHR$(13) THEN 110
360 GOTO 340
370 DATA I FLY AN AIRPLANE.,PILO
T
380 DATA I BRING THE FOOD AT RES
TAURANTS.,WAITER
390 DATA I CUT AND STYLE PEOPLES
' HAIR.,BARBER
400 DATA I MAKE THE FOOD AT REST
AURANTS.,COOK
410 DATA I SELL THINGS AT STORES
.,SALESMAN
420 DATA I HELP DOCTORS MAKE PEO
PLE WELL.,NURSE
430 DATA I PUT TO PUT OUT FIRES.
,FIREMAN
440 DATA I HELP STUDENTS TO LEAR
N THINGS.,TEACHER
450 DATA I FIX CARS AND TRUCKS.,
MECHANIC
460 DATA I CLEAN AND FIX-UP BIG
HOUSES.,JANITOR
470 DATA I WORK IN AN OFFICE.,SE
CRETARY
480 DATA I PROTECT PEOPLE AND PL
ACES.,POLICEMAN
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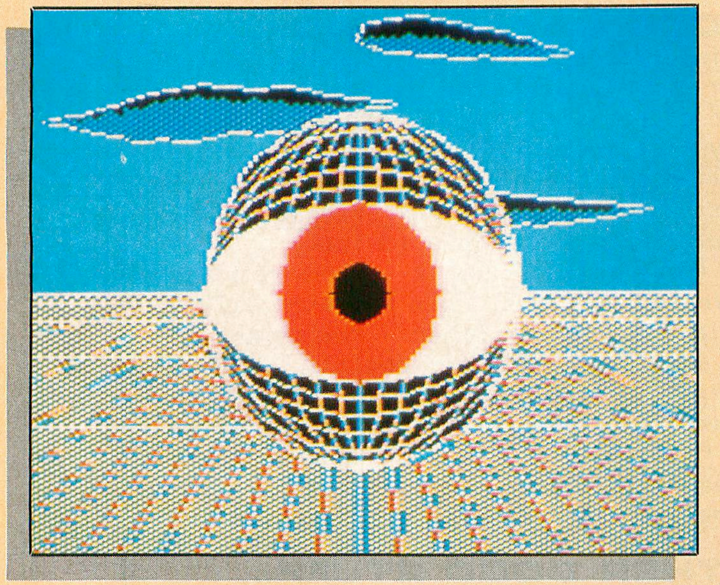
The CoCo Gallery

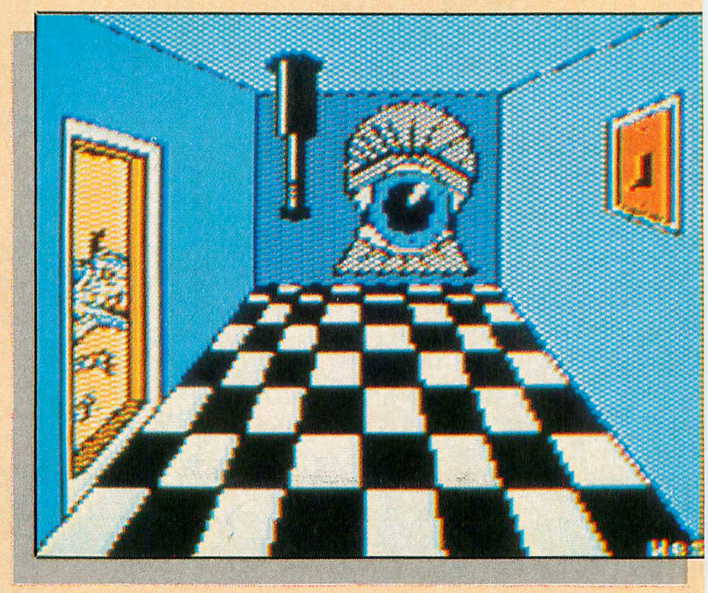


1st PRIZE

Devon Copley

EYE

Our first Gallery of 1986 greets the new year with a toast: "Here's looking at you, kid!" From Amherst, N.Y., Devon used Extended BASIC and *Micropainter* for his sightly creation.

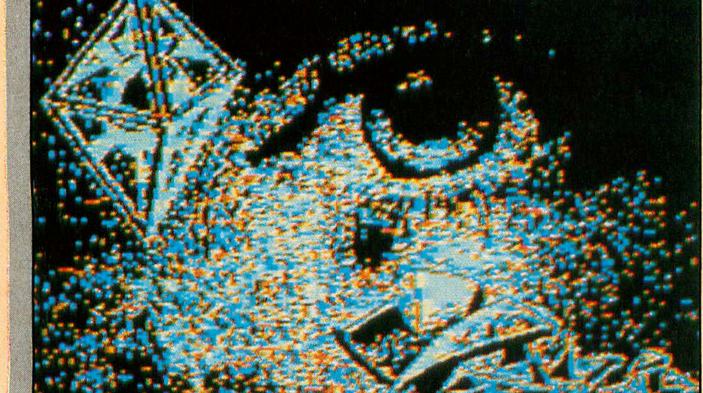


2nd PRIZE

W. Jones

3DRoom

Patrons of the Gallery are cordially invited to gaze at the entry of W. Jones of San Jose, Calif., who used *Graphicom I* and *II* for a work that will return the favor.

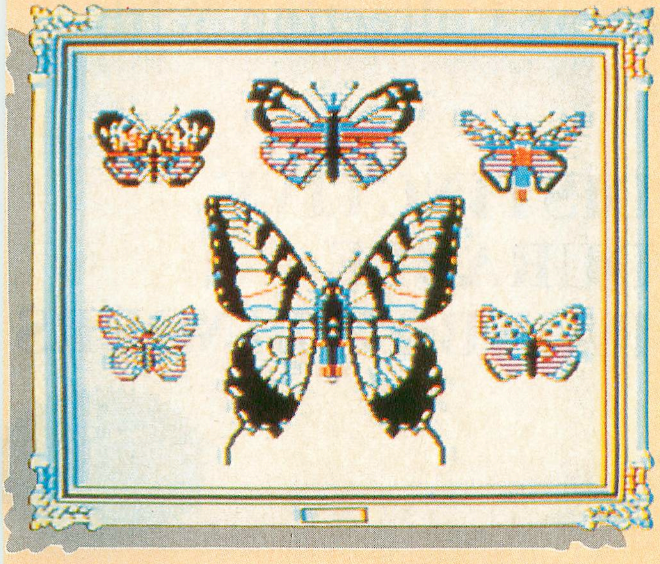


3rd PRIZE

Chris Brown

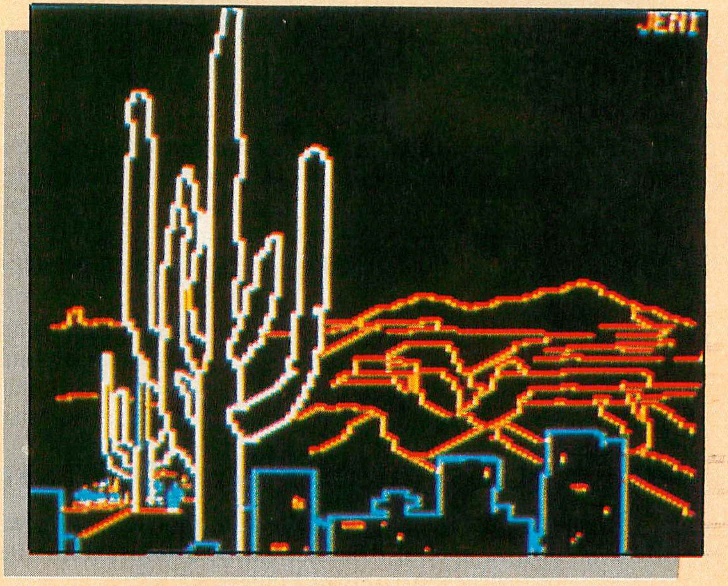
Eyestar

Using *Graphicom* and X-Pad, Chris completes the persistence of vision theme that heralds a new year of CoCo Gallery. Chris lives in Siloam Springs, Ark.



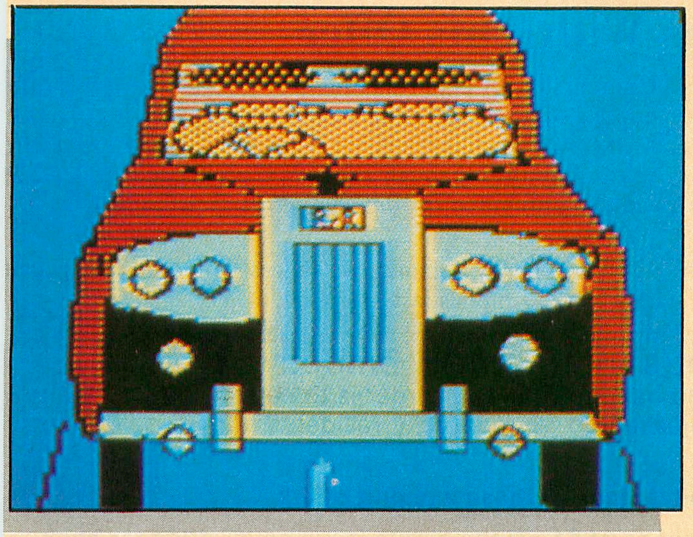
HONORABLE MENTION

J.D. Bousquet
Butterflies
Using *CoCo Max* and a touch pad graphics tablet, J.D. graces our Gallery with a black-and-white collection of butterflies. J.D. lives in St. Raymond, Quebec.



HONORABLE MENTION

Jeni Mitchell
Desert
Using *CoCo Paint*, Jeni gives us a tranquil desert scene. Jeni lives in Lancaster, Wis.



HONORABLE MENTION

Jose Bray
Rolls Royce
Jose lives in San Diego, Calif., and using *CoCo Max* and a mouse he drew a classic Rolls Royce to bring the first CoCo Gallery of 1986 to an elegant conclusion.

SHOWCASE YOUR BEST!

You are invited to nominate original work for inclusion in upcoming showings of "CoCo Gallery." Share your creations with the CoCo Community!

Be sure to send a cover letter with your name, address and phone number, detailing how you created your picture (what programs you used, etc.) and how to display it. Also, please include a few facts about yourself.

Don't send us anything owned by someone else; this means no game screens, digitized images from TV programs or material that's already been submitted elsewhere.

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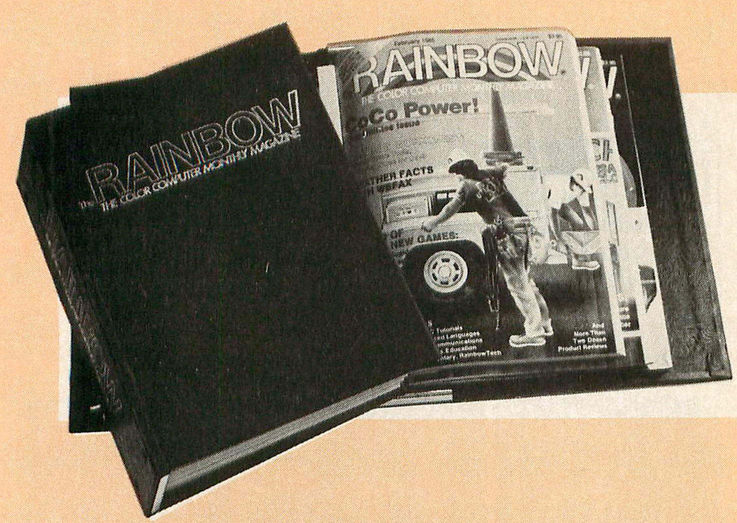

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The Learning Process: The Importance Of 'How To Think'

By Michael Plog, Ph.D.
Rainbow Contributing Editor

For many years, educators have faced the problem of process versus product for student learning. I assume Plato had a similar problem when he started his school in ancient Greece.

The product of student learning is easy to see and easy to measure. A student either knows or does not know, for example, the date the Normans invaded England, the right answer to a mathematics problem, the location of a river, etc. These things are the product of learning. Most achievement tests — compiled by a teacher or commercially made — deal with the products of learning. Generally, products of learning are facts.

The process a student uses to get the correct answer, however, is an entirely different matter. Here, the question is not so much a single correct response, but what steps the student takes to get the answer. Do you remember math teachers saying they were less worried about the right answer than in how you *got* the answer? Those teachers were more concerned with the processes the student had to go through than simply knowing the right answer. In many ways, the process of learning is more important than the product.

We know it is impossible for students to learn everything that is important in any single field. There is too much factual knowledge to be retained by any one person, even experts in specialized areas. If students have the correct process of inquiry, they will be able to find knowledge when they need it, and apply it to their own life situations and problems. This skill, the ability to find the correct answer, is more important than any single correct answer we can ever teach.

As far as I know, the microcomputer is not used very much for process learning in schools. This is a shame, because these skills are much more important to people than simple factual knowledge. If you know how to find and interpret factual knowledge, you have a much better chance for success in any venture. Most microcomputer work in schools is still drill and practice — learning factual knowledge from a screen instead of a workbook. Very little work with the microcomputer is trying to get students to put together a body of facts to come to a new understanding of the material being covered.

It is somewhat ironic that process learning is more common in non-educational uses of the microcomputer. Adventure games and Simulations are usually marketed as entertainment items. In an Adventure game, the players must learn the rules as the game is played. This is a type of process learning. Adventure games involve a process the player needs to learn in order to solve the game correctly. Unfortunately, few of the processes used in Adventure games are valuable in normal school settings.

Simulations, on the other hand, are ideally suited to process learning. In a Simulation, players are given the opportunity to try different situations, see what happens, and form conclusions. When you stop and think about that, we have the same steps as the "scientific method," a process of thinking used in all fields of learning, not just the traditional science fields.

The scientific method starts with observations, which lead to a set of questions about the topic. The questions lead to a set of hypotheses. A hypothesis is not simply a question, but a question stated in such a way that it can be tested — found to be true or false. The next step is to test the hypotheses, to determine which are accu-

(Michael Plog received his Ph.D. degree from the University of Illinois. He has taught social studies in high school, worked in a central office of a school district and currently is employed at the Illinois State Board of Education.)

rate and which are false. The final step is to draw conclusions that help explain the world around us.

The scientific method is used by scholars in all fields of learning. Sociologists, for example, consider themselves scientists of human group behavior. They follow the same steps of inquiry as the chemists, but with different considerations. The content of sociology is different from the content of chemistry; the process of inquiry and learning is the same for both fields.

A microcomputer Simulation can provide a great help to this process. Observations no longer have to be based on students actually looking at something. The computer can tell you what will happen in different situations. This can lead to faster development of hypotheses, and some Simulations are set up to actually test hypotheses. Thus, conclusions can be drawn faster.

I recently saw an interesting Simulation disguised as a science test. The student is presented with a problem about the shape of red blood cells in salt water solutions. As the amount of salt in the solution changes, the shape of the blood cell changes. The student is given the opportunity to go through a series of experiments, then asked to select the best conclusion from the information provided. Without ever using the word "hypothesis," students are expected to conduct tests on a series of hypotheses and draw conclusions about shapes of blood cells in solutions containing different amounts of salt.

In this particular example, the microcomputer keeps track of the choices made by the student — at each step of the process. The correct answer is far less important than the steps taken by the student to get the result. This test is designed to see how students go through the process of science. Chances are that students in most schools will not have conducted this experiment, even if the school has the equipment required. Thus, the test developers are assuming the problem is unknown to the students and the process will have to be followed, instead of the students relying on past knowledge (product).

This Simulation was designed as a test of student ability to follow the process of science. Yet, the same program could be used as instruction for students instead of a test. Students in a science class could use this same program to conduct experiments that are generally not done in most science classes today.

It is my opinion that we need more educational Simulations for instruction in classrooms. Science Simulations are easy to construct because we have a large amount of information on experiments conducted by professionals. That knowledge can be reshaped into Simulation exercises for students. But science is not the only area that can benefit. Social studies Simulations, based on actual past events, can also be used to give the student a sense of the processes involved.

From my limited knowledge, the main thing that separates entertainment Simulations from educational Simulations is the content of the program Instead of dealing with a mystery stor or a futuristic army, educational Simulations deal with some topic relevan to a classroom. Also, many educationa Simulations have been written by people who are knowledgeable about programming, but have limited classroo experience.

Do any of you have Simulations yo use in classrooms? Have you writte Simulations that are appropriate fo student use? Your Color Computer i ideally suited to Simulations. If you us a disk drive, you can have a long Simulation lesson. Even with a tape recorder, the Color Computer can divid the Simulation into several parts, eac following logically from the other. Yo are not limited to 64K with Simulations

Students today need to learn th processes of learning, especially so t counteract the misguided emphasis o factual learning promoted by som people who do not understand deductive thought. In many ways, it is th most basic education we can provid students. (And I do hope we are a students, continuing to learn no matte what our age.) We need to encourag such use of the *microcomputer*, an especially encourage the developmen of software for this purpose.

If you do use Simulations on you Color Computer for educational purposes, I welcome the opportunity t know of your efforts. If you want t share thoughts, programs, suggestion or even disagreements, write to me a 829 Evergreen, Chatham, IL 62629. □

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Program distribution includes both [2K] CoCo-dependent and [4K] stand-alone Versions.
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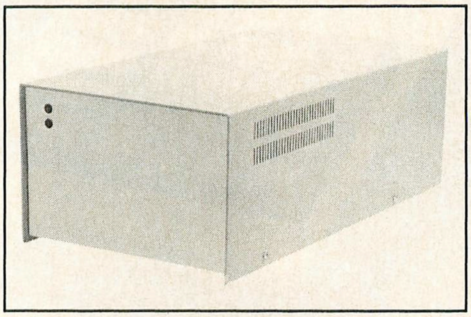

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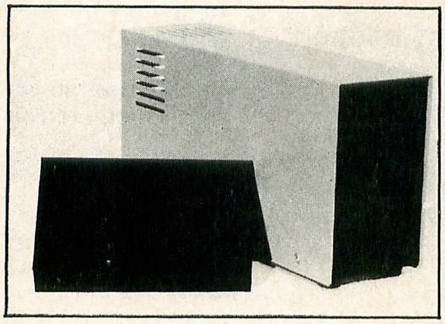

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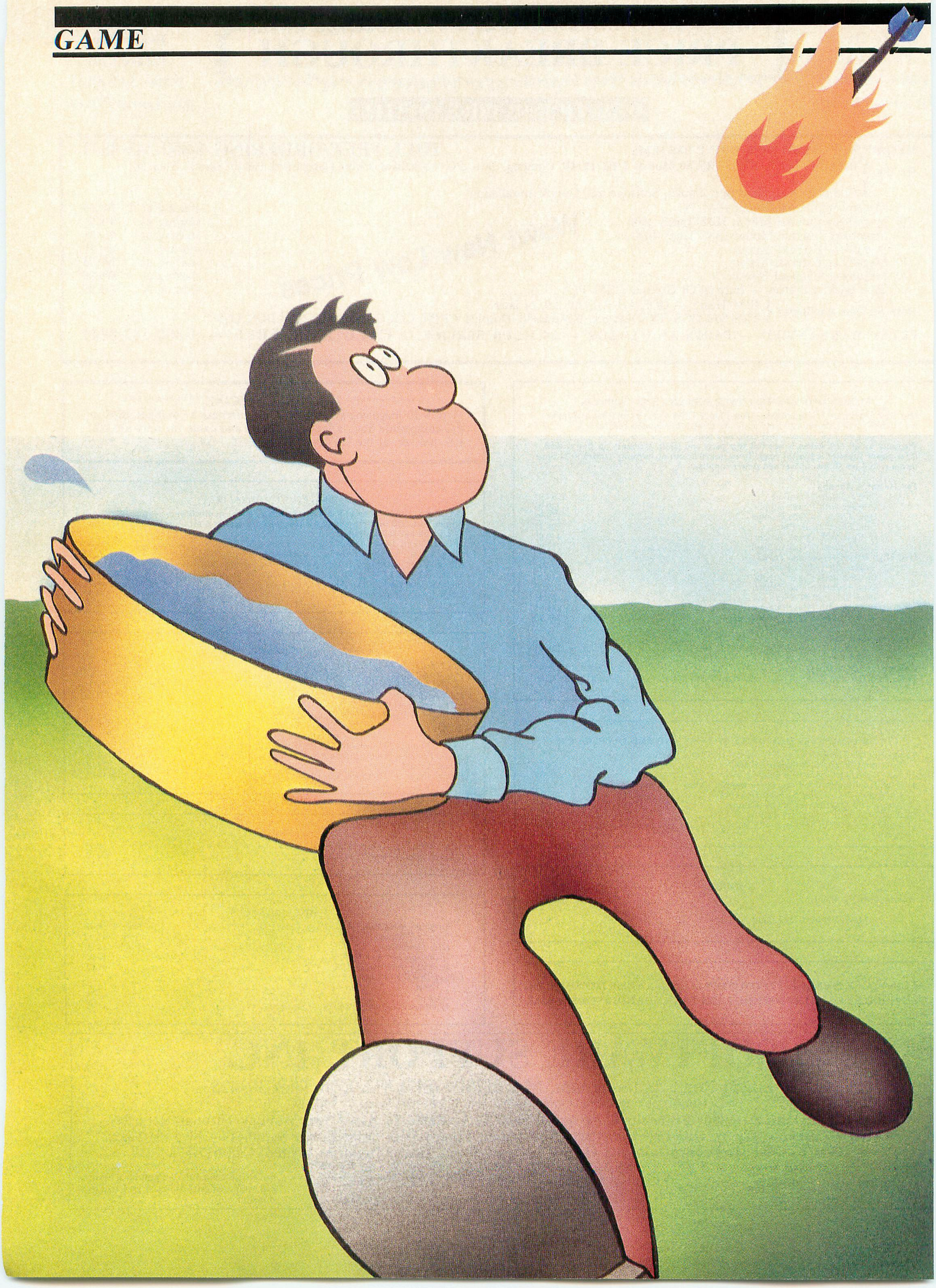
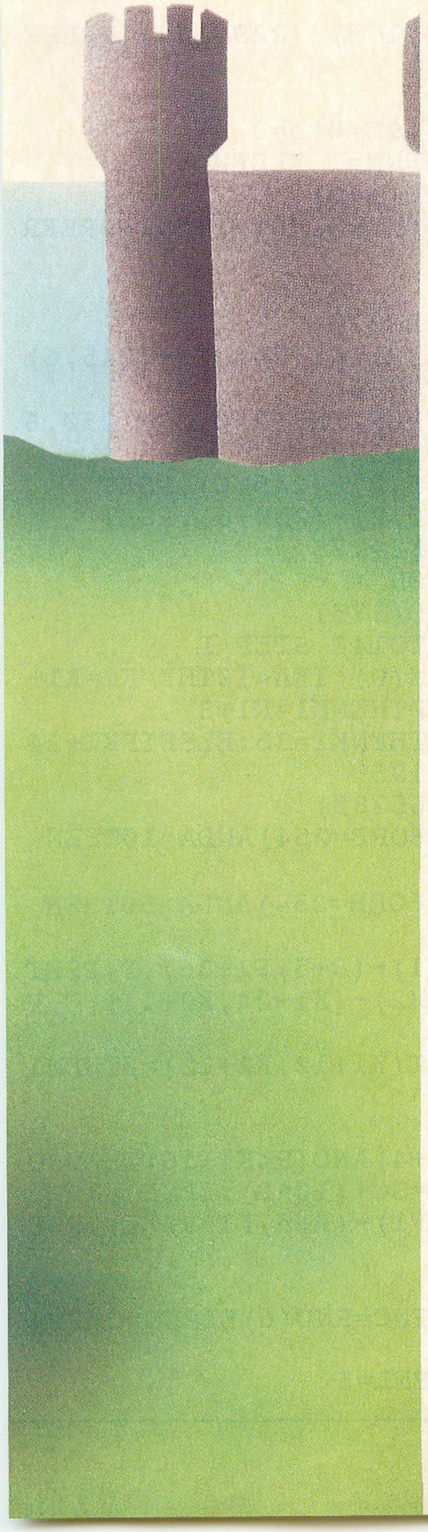


Save the kingdom of Ferra from the blazing perils . . .

Firestorm



By Mike Kilby

A terrible crisis has begun in the small kingdom of Ferra. Great arrows of fire falling from the sky have started to destroy the land. The King has called a meeting of the people to hear suggestions on how to save the kingdom. During the meeting you snicker sarcastically and say to yourself, "With a bucket of water." The King overhears you and thinks it's a wonderful idea, so he chooses you to carry out the task. The King and the kingdom are depending on you!

Your job is to carry a bucket of water and catch the falling fire arrows, which are worth points. To further complicate things, a time bomb has been planted beneath the ground upon which the fire drops. If an arrow hits this bomb the entire kingdom will be destroyed. Also, if fire reaches the ground, points are lost and a hole is left into which you must jump in order to catch the other falling menaces.

Firestorm, requiring Extended Color BASIC, is an arcade-type game involving skill and luck. The high-speed `POKE` is used in Line 90. For those who cannot use the high-speed `POKE`, simply remove `POKE 65495,0` from the line. The number of men (three are given at the beginning of the game) is indicated by the lines at the top right of the graphics screen. The men are moved side to side by using the right joystick. The game begins after a title and difficulty screen are displayed.

(You may contact Mike with any questions about *Firestorm* at 5876 Montgomery County Line Rd., Englewood, OH 45322, phone 513-832-2393. Please include an SASE when writing.) ☐

(Mike Kilby is a sophomore at Northmont High School in Englewood, Ohio, where he is currently taking computer courses. His favorite hobby is working on his CoCo. He hopes to become a computer programmer.)

240	76
470	34
670	140
920	5
1000	22
1310	194
END	160

The listing: `FIRESTRM`

```
10 GOTO 1100
20 PMODE 4,1
30 HS=0
40 DIM C(5,5),F(5,5)
50 DRAW"S4BM8,0;DR8UDBDL8D2F2D5U
2RU5RD5RD2U5E2U"
60 GET(0,0)-(24,11),C,G
70 DRAW"BM3,28;D4F2U3D3G2UGHU2F"
80 GET(0,0)-(5,36),F,G
90 PCLS:POKE65495,0
100 FORBH=1TO30STEP7
110 FORBV=150TO190STEP14
120 LINE(BH,BV)-(BH+5,BV+5),PSET
,BF
130 NEXTBV,BH
140 FORBH=5TO30STEP7
150 FORBV=157TO190STEP14
160 LINE(BH,BV)-(BH+5,BV+5),PSET
,BF
170 NEXTBV,BH
180 FORBH=220TO255STEP7
190 FORBV=150TO190STEP14
200 LINE(BH,BV)-(BH+5,BV+5),PSET
,BF
210 NEXTBV,BH
220 FORBH=223TO250STEP7
230 FORBV=157TO190STEP14
240 LINE(BH,BV)-(BH+5,BV+5),PSET
,BF
250 NEXTBV,BH
260 LINE(35,187)-(220,190),PSET,
BF
270 LINE(26,175)-(229,186),PRESE
T,BF
280 SCREEN1,1
290 C=0:L=4:SC=0:M=3
300 IFQ=1THENN=1 ELSEN=5
310 P=40+RND(170)
320 DRAW"C0BM"+STR$(P)+",189REFR
LGH"
330 COLOR1
340 IFM=3THEN370
350 IFM=2THENLINE(245,2)-(245,6)
,PRESET:GOTO380
360 IF M=1THENLINE(250,2)-(250,6
),PRESET:GOTO390
370 LINE(245,2)-(245,6),PSET
380 LINE(250,2)-(250,6),PSET
390 K1=100:K2=175
400 FORT=1TON
410 R=35+RND(175)
420 FORF1=0TO140 STEP L
430 A=JOYSTK(0):IFA<10THENK1=K1-
8:ELSEIFA>50THENK1=K1+8
440 IFK1<35THENK1=35:ELSEIFK1+24
>218THENK1=195
450 B=PEEK(65280)
460 IF(B=126ORB=254)ANDA<10THEN
GOSUB870
470 IF(B=126ORB=254)ANDA>50THEN
GOSUB940
480 PUT(R,F1)-(R+5,F1+36),F,PSET
490 PUT(K1,K2)-(K1+24,K2+11),C,P
SET
500 IFPPOINT(K1+12,K2+12)=0THEN1
010
510 NEXTF1
520 IF(R>K1+4)AND(R<K1+16)THENSO
UND250,1:SC=SC+(10*L):ELSE 630
530 LINE(R,F1)-(R+5,F1+36-L),PRE
SET,BF
540 NEXTT
550 IFQ=1THENC=RND(6)ELSEC=C+1:N
=N+5
560 IFC=1THENL=5
```

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DISK — DLOAD, DSAVE, DCLOSE, DSAVEWS, DLOADWS, DIR, KILL, VERIFY

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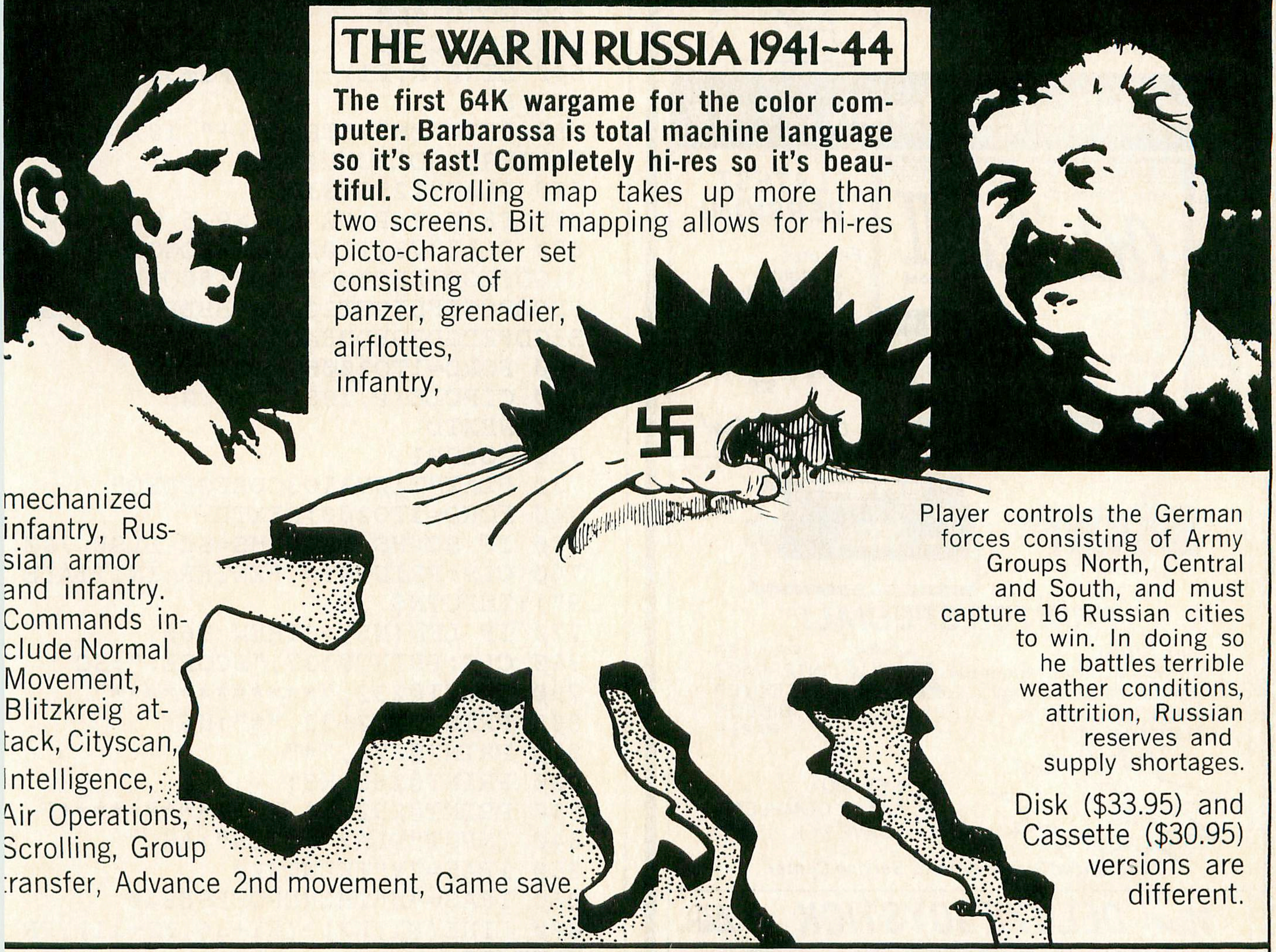

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PHALANX By John Galus. 32K Hi-res ML game circa Alexander the Great. Bit mapped graphics. Player controls Cavalry, Archers, Phalanxes in an attempt to out manuever and out fox the enemy. Choose Attack, Defensive, Normal or Range stance for combat on any of three battlefields. Disk ($30.95) and Cassette ($27.95) versions are different.

D-DAY THE 6th of JUNE By Phil Keller. 64K Hi-Res ML game (See Barbarossa for graphics information). Player designs order of battle consisting of Rangers, Infantry, Armor, Recon, Fighter Bombers, Airborne and Artillery. Bit mapped graphics. A host of options including air support and naval battery fire. You even get to see things explode. Disk ($33.95) and Cassette ($30.95) versions are different.

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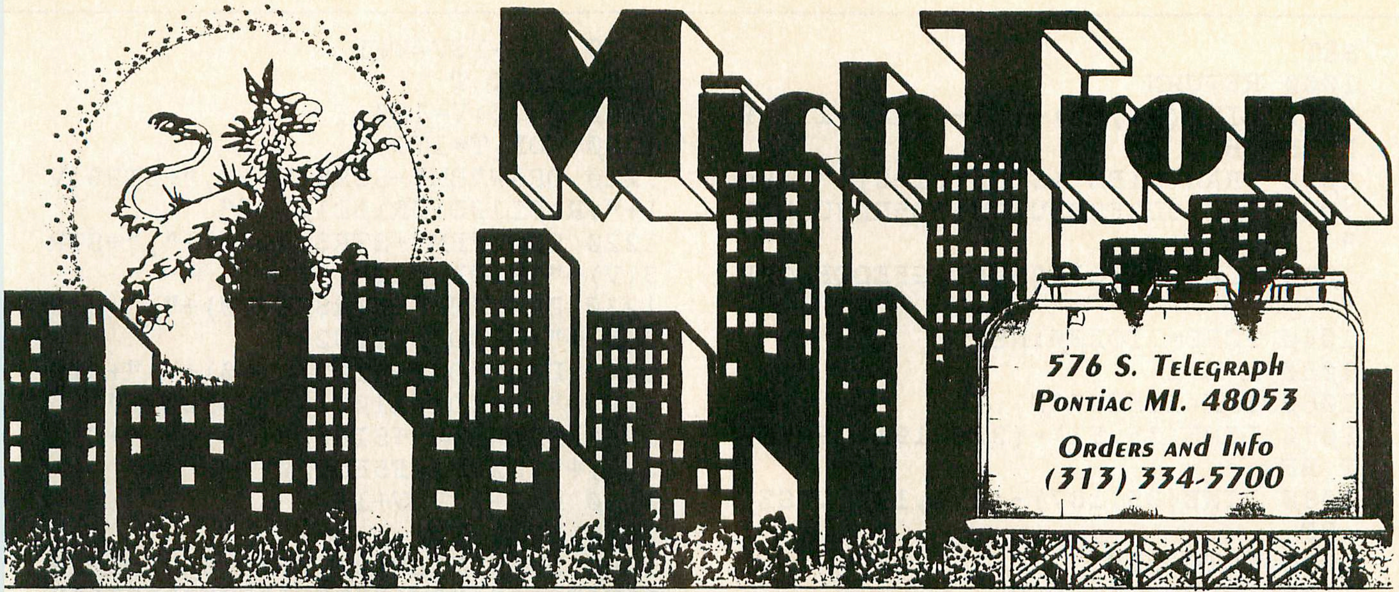
```
570 IFC=2THENL=7
580 IFC=3THENL=10
590 IFC=4THENL=14
600 IFC=5THENL=20
610 IFC=6THENL=28
620 GOTO 400
630 SC=SC-30
640 LINE(R,F1)-(R+5,F1+36-L),PRESET,BF
650 DRAW"BM"+STR$(R)+",187;C0FD2R4U2ERL2GDL3UHR4DL2"
660 PLAY"T255V31D"
670 IF R+3<P OR R+3>P+5 THEN540
680 PLAY"V31T100O1GFFEDGO3GDBEFDO4GDFEGDFEBCEGDFEGDT150O3DFEGDFEGDCBDCGEFDEGDT200O1BBBBBDGEFDGBBBEGDFEDGDEGEDBBAG"
690 FORD=1TO200STEP2
700 CIRCLE(P,188),D,,.25
710 NEXTD
720 COLOR1
730 PLAY"T10V31O3CDEFGFDED"
740 FORD=1TO200:NEXTD
750 IF SC>HS THEN HS=SC ELSE 780
760 CLS:PRINT@70,"ENTER INITIALES";:INPUTN$
770 IF LEN(N$)>3THEN 760
780 CLS:PRINT@137,"SCORE:";SC
790 PRINT@232,"************"
800 PRINT@232+32,"*";N$
810 PRINT@275,"*"
820 PRINT@268,HS;
830 PRINT@232+64,"************"
840 INPUT"PLAY AGAIN";A$
850 IFA$="Y"THEN1320
860 IFA$="N"THENENDELSE840
870 LINE(K1,K2)-(K1+36,K2+11),PRESET,BF
880 K1=K1-4:K2=K2-11
890 PUT(K1,K2)-(K1+24,K2+11),C,PSET
900 LINE(K1,K2)-(K1+24,K2+11),PRESET,BF
910 K1=K1-4:K2=K2+11
920 PUT(K1,K2)-(K1+24,K2+11),C,PSET
930 RETURN
940 LINE(K1,K2)-(K1+24,K2+11),PRESET,BF
950 K1=K1+4:K2=K2-11
960 PUT(K1,K2)-(K1+24,K2+11),C,PSET
970 LINE(K1,K2)-(K1+24,K2+11),PRESET,BF
980 K1=K1+4:K2=K2+11
990 PUT(K1,K2)-(K1+24,K2+11),C,P
```



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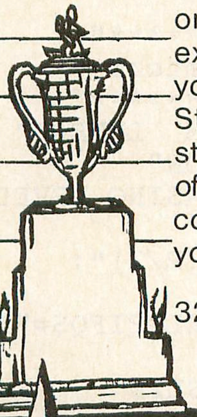
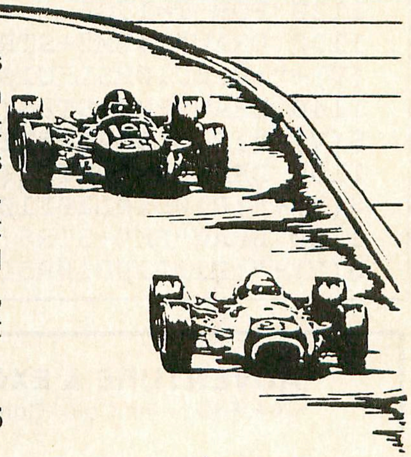
SPEED RACER

by Steven Hirsch





The checkered flag drops as your pulse rises in this lively new arcade game. The road twists to the horizon on the 3-D panorama that sets the stage for the most exciting race the CoCo has ever seen! Vie for time as you speed through the curves at incredible speeds. Step through the gears to stay ahead of the pack, but step lively since some will stop at nothing to see the end of the race, or the end of you! Four challenging raceways, complete with obstacles and colorful 3-D scenery, put your skills to the test in this Pole Position™ type game.

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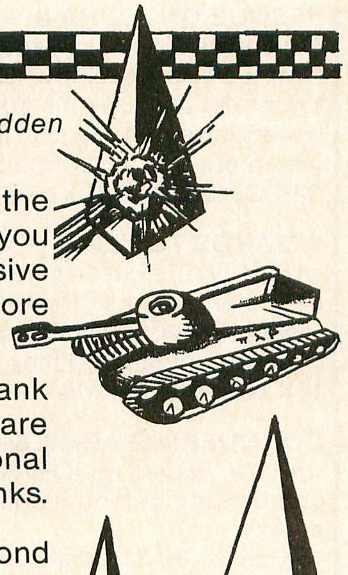
ROMMEL 3-D

By Kary McFadden



You clutch the tank controls, searching for any sign of the enemy. Suddenly a blip appears on radar! Frantically, you move your tank into position. At last you spot the elusive enemy tank! Facing it, you race to lock sights and fire before he does!

Enter the ultimate battle-zone in this exciting 3-D tank combat game. Strategy, speed, and your tank's cannon are your only hope as you wind through a three-dimensional course inhabited by impenetrable barriers and enemy tanks.

Dazzling graphics and lifelike sound take you a step beyond the ordinary in this fast, machine-language arcade game. Enter the next dimension, ROMMEL's troops are waiting for you!

32K Color Computer Required. **$29.95**

```
SET
1000 RETURN
1010 LINE(K1,K2)-(K1+24,K2+11),P
RESET,BF
1020 DRAW"C1BM"+STR$(K1+8)+",180
;DR8UDBDL8D2F2D5U2RU5RD5RD2U5E2U
"
1030 PLAY"V31O1T25DDEGGFEDDEGGFE
"
1040 FORD=1TO200:NEXTD
1050 M=M-1
1060 IFM<1THEN730
1070 LINE(35,F1)-(220,191),PRESE
T,BF
1080 LINE(35,187)-(220,190),PSET
,BF
1090 GOTO 320
1100 PMODE3,1:PCLS
1110 H=85:V=40
1120 FOR T=1TO5
1130 DRAW"C4BM"+STR$(H)+","+STR$
(V)+";D20U10R5L5U10R10"
1140 DRAW"BM"+STR$(H+20)+","+STR
$(V)+";R10L5D20R5L10"
1150 DRAW"BM"+STR$(H+40)+","+STR
$(V)+";R10D10L10F10H10U10D20"
1160 DRAW"BM"+STR$(H+60)+","+STR
$(V)+";R10L10D10R5L5D10R10"
1170 H=H+1:V=V+1
1180 NEXT T
1190 H=75:V=120
1200 FOR T=1TO 5
1210 DRAW"BM"+STR$(H)+","+STR$(V
)+";R10L10D10R10D10L10"
1220 DRAW"BM"+STR$(H+20)+","+STR
$(V)+";R10L5D20"
1230 DRAW"BM"+STR$(H+40)+","+STR
$(V)+";R10D20L10U20"
1240 DRAW"BM"+STR$(H+60)+","+STR
$(V)+";R10D10L10F10H10U10D20"
1250 DRAW"BM"+STR$(H+80)+","+STR
$(V)+";D20U20F5E5D20"
1260 H=H+1:V=V+1
1270 NEXT T
1280 DRAW"S8BM120,75;D10RU10RD10
F3U6D6G2L4H2U6D5REFR2EFHGLD5EL2"
1290 SCREEN1,0
1300 PLAY"T3V31O1DDGDDFDDGDDCDDC
DDT1D"
1310 FORD=1TO1200:NEXTD
1320 CLS
1330 PRINT@9,"************"
1340 PRINT@41,"*fire storm*"
1350 PRINT@73,"************"
1360 PRINT@136,"RANDOM  LEVELS"
1370 PRINT@201,"       OR"
1380 PRINT@263,"INCREASING LEVEL
S"
1390 PRINT@360,"INPUT(R/I)";
1400 INPUTQ$
1410 IFQ$="R"THENQ=1 ELSEIFQ$="I
"THENQ=2:ELSE1390
1420 IFA$="Y"THEN90ELSE20
```

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One-Liner Contest Winner . . .

This one-liner prints all the ASCII characters available on your CoCo, along with their hexadecimal values.

The listing:

```
10 CLS:PRINT"THIS PROG WILL PRIN
T ALL THE ASCCHAR.PRESS ANY KEY"
:X=33:EXEC44539:FORZ=1TO6:CLS:A=
1:B=32:FORM=1TO5:FORT=1TO10:PRIN
T@B,HEX$(X+N):PRINT@A,CHR$(X+N):
IFN=222THENEXEC44539:RUN10ELSEA=
A+3:B=B+3:N=N+1:NEXTT:A=A+66:B=B
+66:NEXTM:EXEC44539:NEXTZ
```

Cliff Richardson
Bellefontaine, OH

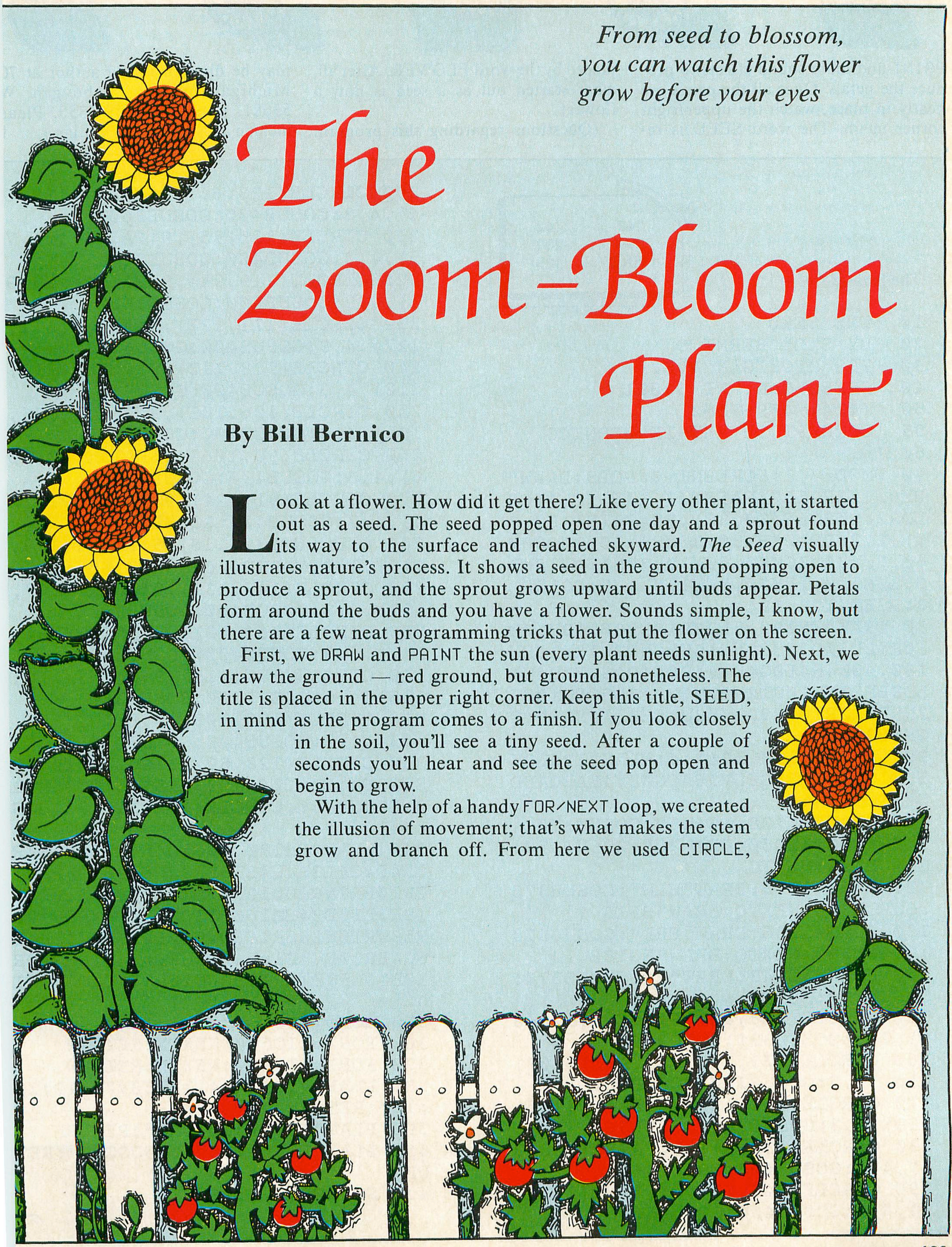
(For this winning one-liner contest entry, the author has been sent copies of both *The Second Rainbow Book Of Adventures* and its companion *The Second Rainbow Adventures Tape*.)

16K
ECB

From seed to blossom,
you can watch this flower
grow before your eyes

The Zoom-Bloom Plant

By Bill Bernico



Look at a flower. How did it get there? Like every other plant, it started out as a seed. The seed popped open one day and a sprout found its way to the surface and reached skyward. *The Seed* visually illustrates nature's process. It shows a seed in the ground popping open to produce a sprout, and the sprout grows upward until buds appear. Petals form around the buds and you have a flower. Sounds simple, I know, but there are a few neat programming tricks that put the flower on the screen.

First, we `DRAW` and `PAINT` the sun (every plant needs sunlight). Next, we draw the ground — red ground, but ground nonetheless. The title is placed in the upper right corner. Keep this title, SEED, in mind as the program comes to a finish. If you look closely in the soil, you'll see a tiny seed. After a couple of seconds you'll hear and see the seed pop open and begin to grow.

With the help of a handy `FOR/NEXT` loop, we created the illusion of movement; that's what makes the stem grow and branch off. From here we used `CIRCLE`,

PAINT and more sound effects to produce the petals. Once all the petals are neatly in place, watch the upper right corner again. The word SEED is replaced by the word FLOWER. After all, what started out as a seed is now a flower!

(Questions regarding this program may be directed to the author at 7 Michigan Avenue, Sheboygan, W 53081, phone 414-459-7350. Pleas include an SASE when writing.)

140 42
290 230
END 129

The listing: THE SEED

```
10 'THE SEED
20 'BY BILL BERNICO
30 '708 MICHIGAN AVE.
40 'SHEBOYGAN, WI 53081
50 '(414) 459-7350
55 'CONCEPT BY KATHIE BERNICO
60 '
70 PMODE3,1:SCREEN1,0:PCLS:DRAW"
BM0,178R255":PAINT(3,179),4,4:CO
LOR2:CIRCLE(30,30),25:PAINT(30,3
0),2,2:DRAW"BM30,30M50,80M30,30M
60,60M30,30M80,50M30,30M15,110M3
0,30M110,15M30,30M110,15":COLOR
3:PSET(128,184)
80 DRAW"BM190,5L20R10D20BR18U20D
10R12U10D20BR8NR10U10NR7U10R10BM
180,40U4H4L8G4D4F4R8F4D4G4L8H4U4
BD8BR23NR10U12NR7U12R10BR7NR10D1
2NR7D12R10BR9R10E3U18H3L10D24":G
OSUB360
90 CIRCLE(128,184),4:PLAY"T25L25
5V31O1ADCFBAGEDV16ACGADV4EABCAED
B":GOSUB360
100 DRAW"BM128,184U5":GOSUB370
110 FORG=1TO50:DRAW"U":GOSUB370:
GOSUB390:NEXTG
120 FORQ=1TO6:DRAW"HLH":GOSUB370
:GOSUB390:NEXTQ:DRAW"BF18
130 FORQ=1TO6:DRAW"ERE":GOSUB370
:GOSUB390:NEXTQ:DRAW"BG18BU12
140 FORG=1TO43:DRAW"U":GOSUB370:
GOSUB390:NEXTG
150 CIRCLE(128,80),8:PAINT(128,8
0),2,3:GOSUB380:GOSUB360
160 CIRCLE(103,115),8:PAINT(103,
115),2,3:GOSUB380:GOSUB360
170 CIRCLE(155,119),8:PAINT(155,
119),2,3:GOSUB380:GOSUB360
180 CIRCLE(138,91),9:PAINT(138,9
1),4,3:GOSUB400:GOSUB360
190 CIRCLE(143,75),9:PAINT(143,7
5),4,3:GOSUB400:GOSUB360
200 CIRCLE(128,66),9:PAINT(128,6
6),4,3:GOSUB400:GOSUB360
210 CIRCLE(115,75),9:PAINT(115,7
5),4,3:GOSUB400:GOSUB360
220 CIRCLE(119,91),9:PAINT(119,9
1),4,3:GOSUB400:GOSUB360
230 CIRCLE(111,127),9:PAINT(111,
127),4,3:GOSUB400:GOSUB360
240 CIRCLE(118,112),9:PAINT(118,
112),4,3:GOSUB400:GOSUB360
250 CIRCLE(106,101),9:PAINT(106,
101),4,3:GOSUB400:GOSUB360
260 CIRCLE(90,106),9:PAINT(90,10
6),4,3:GOSUB400:GOSUB360
270 CIRCLE(91,124),9:PAINT(91,12
4),4,3:GOSUB400:GOSUB360
280 CIRCLE(139,116),9:PAINT(139,
116),4,3:GOSUB400:GOSUB360
290 CIRCLE(147,133),9:PAINT(147,
133),4,3:GOSUB400:GOSUB360
300 CIRCLE(164,131),9:PAINT(164,
131),4,3:GOSUB400:GOSUB360
310 CIRCLE(170,115),9:PAINT(170,
115),4,3:GOSUB400:GOSUB360
320 CIRCLE(155,103),9:PAINT(155,
103),4,3:GOSUB400:GOSUB360
330 CIRCLE(128,80),3:GOSUB410:GO
SUB360:CIRCLE(103,115),3:GOSUB41
0:GOSUB360:CIRCLE(155,119),3:GOS
UB410
340 DRAW"BM180,40C1U4H4L8G4D4F4R
8F4D4G4L8H4U4BD8BR23NR10U12NR7U1
2R10BR7NR10D12NR7D12R10BR9R10E3U
18H3L10D24BM160,32C3L10D8NR7D12B
R18NR10U20BR16BD4D12F4R6E4U12H4L
6G4BR20BU4D16F4E4NU6F4E4U16BR6NR
10D10NR7D10R10BR6U20R8F4D3G4L7F1
0
350 GOTO 350
360 FORX=1TO500:NEXTX:RETURN
370 FORX=1TO100:NEXTX:RETURN
380 PLAY"V3O5T4L4;12T50V20;12;12
;10":RETURN
390 PLAY"T200V31O1DAC":RETURN
400 PLAY"L255T255V20O5CGCEC":RET
URN
410 SOUND240,1:RETURN
```

Understanding how a computer works

A Beginner's Hardware Course

Part 1

By Tony DiStefano
Rainbow Contributing Editor

This being the Beginners issue, I will start a multi-part article on how a computer works, starting from "simple theory" to "how to build one of my projects." This month, we will begin with basic concepts: what is a it, what does digital mean, what is analog, how does it iffer from digital, and a look at a different numbering system.

The dictionary meaning of analog is "proportionate." When speaking, you can speak loud or low. Light can be ark or bright, or any shade in-between. Radio waves and TV pictures are all said to be analog signals. These are examples of analog wave shapes — continuously changing. When we talk about a digital system, there are no shades r continuous motion. There are only two states in a digital gnal: ON or OFF. There is no in-between. This is the core f computing. Everything your computer does is accomplished using these two states. OK, let's expand on these tates.

First, there is ON. It is also known as "high" (Hi or 'H'), plus," "one" (or '1'), "mark," "voltage" and many others. he two terms I use most often are Hi and '1'; these are he terms I will use throughout these articles. In most microcomputers, the operating voltage for the hardware is ve volts. Virtually all the mircocomputer and support hips work with five volts. It is pretty much a norm. Given his, a Hi measures about five volts on a voltage meter, but 4.5 volts is also considered Hi. There are limits to how low the voltage can be before it is considered invalid. In fact, any voltage greater than two volts is considered to be a logic level Hi or '1'.

Next is the OFF state. It, too, has many names: "low" (Lo or 'L'), "minus," "zero" (or '0'), "space" and "ground," just to name a few. To keep consistent, I will use Lo and '0' to mean OFF. A low state is considered to have zero volts and when measured with a voltage meter, nothing registers. Under certain conditions, a small voltage can be present. Any voltage below .8 volts is considered to be a logic level '0'. Any voltage greater than .8 volts or less than two volts is not a valid logic state and results are, at least, unpredictable.

Now we know about the highs and lows of digital operation. The next step is a "bit." A bit is one piece of logic information. It has, as we now know, two states, either Lo or Hi. It's also known as a binary digit, binary meaning two. The two states are:

State 0 = 0 (Low)
State 1 = 1 (High)

But, just two pieces of information is not very much to work with. If we use two bits side by side, and considered every combination of 0's and 1's, there are four separate combinations.

State 0 = 00
State 1 = 01
State 2 = 10
State 3 = 11

Tony DiStefano is well-known as an early specialist in computer hardware projects. He lives in Laval Ouest, Quebec.)

If you have three bits side by side, there are eight different combinations.

State 0 = 000
State 1 = 001
State 2 = 010
State 3 = 011
State 4 = 100
State 5 = 101
State 6 = 110
State 7 = 111

Can you see a pattern start to develop? Every time one more bit is added, you double the amount of different combinations possible. This is known as Base 2 or binary numbering system. Most of us are more familiar with Base 10 or decimal numbering system. In short, Base 10 numbers, unlike Base 2 numbers, have 10 different combinations per digit.

State 0 = 0
State 1 = 1
State 2 = 2
State 3 = 3
State 4 = 4
State 5 = 5
State 6 = 6
State 7 = 7
State 8 = 8
State 9 = 9

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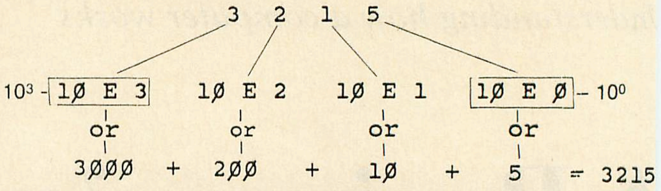
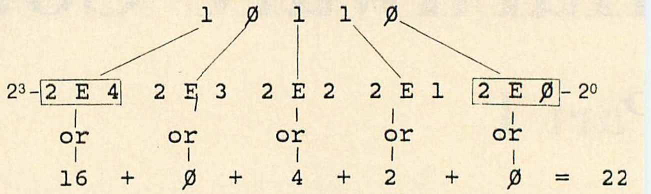
I am sure you recognize these numbers. Once the top of the number ladder is reached, you add another digit to the lef of it. Each number added raises the value of that digit i the number by a factor of 10.



When large numbers are to be represented, there are mor digits. Each new digit added means adding another powe of 10. Numbers ranging in the millions require only seve digits in Base 10 numbers, but require many digits in Bas 2 since every added digit is only to the power of 2.



You can see that a Base 2 number adds up to a lot less tha Base 10. There is yet a better-suited numbering system f computers, but first let's look at a bit more (ha, ha).

The Color Computer (all versions) has an eight-bit CP That means all data, program code and characters a stored in eight-bit values. These groups are better know as bytes. A byte can hold any value from 0000000 (Ba 2) to 1111111, or in decimal, from zero to 255. If yo convert 1111111 to decimal, it works out to 255. Each by in the CoCo is one memory location. A byte can hold o ASCII character, one piece of data or one machine langua code. We'll look more at memory later on.

In the computer environment there is another numberi system. It is most used and is called the hexadecim numbering system, or Hex for short. The Hex system, the name implies, is a Base 16 number. This means the must be 16 symbols before the carry over to the next dig In Hex, the symbols are 0, 1, 2, 3, 4, 5, 6, 7, 8, 9, A, C, D, E and F. Just as the next digit after '3' is '4' (3+1 the next digit after '9' (9+1) is 'A'. Remember that A, B, D, E and F are digits, not letters, in the hexadecimal syste The following table exemplifies the different numberi systems described.

Decimal	Hex	Binary
0	0	0000
1	1	0001
2	2	0010
3	3	0011
4	4	0100
5	5	0101
6	6	0110
7	7	0111
8	8	1000
9	9	1001
10	A	1010
11	B	1011
12	C	1100
13	D	1101
14	E	1110
15	F	1111

As you can see from the table, the Hex numbering system s the most efficient because of its highest base number. The decimal system takes two characters to the one character needed by Hex; binary takes four characters. Since the CoCo has an eight-bit bus (a memory byte), you can represent a memory location with eight bits (11111111) or hree decimal digits (255) or a two-digit Hex number ($FF). From now on we will use all three numbering systems, which ever happens to be the best for the occasion. When using Hex, however, I will put the character '$' in front of it. Some ike to put an 'h' at the rear of the number — both are correct, I just prefer the dollar sign.

Understanding the Hex and binary numbering systems and what they stand for in a computer is the base from where your knowledge of the CoCo will grow. I will not cover adding and subtracting or conversion from one base to another in this article, but if you want to learn more on numbering systems, your local library should have numbering systems in the math section.

One of the command functions built into Extended BASIC s `HEX$`, pronounced "Hex string." This command transfers a normal decimal value into a string variable in hexadecimal ormat. The syntax for this command is `HEX$(X)` where 'X' an be a direct value or any numeric expression. As an xample, to get the Hex equivalent of the decimal value 207, ype `PRINT HEX$(207)` and ENTER. This prints CF and is he Hex equivalent of 207. A very handy command to have.

On the other hand, how would we change a Hex value into a decimal value? Extended BASIC comes to the rescue gain, for it has another function that allows entry of Hex alues, the &H sign. Anytime you need to enter a value in Hex, use the &H in front of the value. For instance, if you ave a line that sets the value of 'X' to the Hex value FF, ou can calculate $FF to a decimal value or you can enter as `100 X = &HFF`. Another use of the function &H is to onvert a Hex number to decimal. Since all numbers printed re done in decimal, to convert a Hex number to decimal ll you have to do is `PRINT &HX` and ENTER, where 'X' is ny Hex number and the result is printed in decimal on the creen. If you are to substitute the letter 'O' instead of 'H', l values will be in octal, or Base 8.

* * *

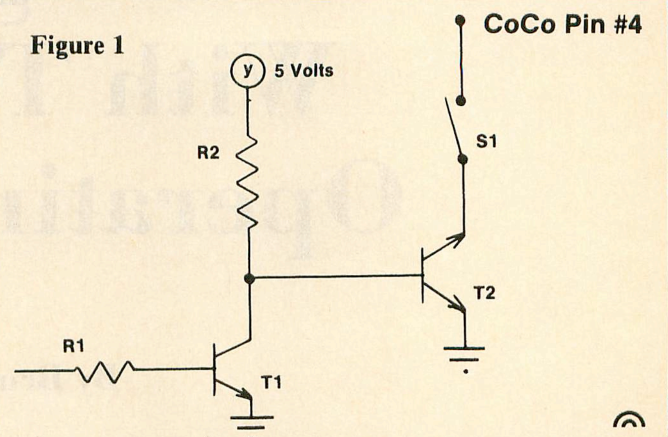
I got a letter from a reader just this week. He pointed ut a problem with "Turn of the Screw" in the November 984 issue. There is mention of a switch in the text, but no uch switch existed in the diagram. Figure 1 shows where his switch goes.

Next month, we'll look into digital logic gates, truth bles and their use in computers.

As a final note for getting started on the new year, I'd like to clarify a few things for my readers. The first is, yes, DISTO Super Products are designed by yours truly, but please try to keep DISTO and RAINBOW separate. If you have a question or something to say about "Turn of the Screw" articles, please route the letters to RAINBOW. If you want some information about DISTO products, call or write to CRC Inc., 10802 Lajeunesse MTL, Quebec, Canada H3L 2E8, phone (514) 383-5293. They handle all production, shipping and "bottle washing." Dealer inquiries are welcomed.

This is my third anniversary writing for RAINBOW and I must say it has been wonderful. You can look forward to more and better projects. ☐

Figure 1



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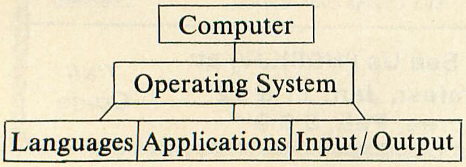
Getting Started With The OS-9 Operating System

By Bruce Warner

Before diving into the considerable technical information required to operate under OS-9, I want to explain that I will give only the information you *need* at any given time. It's more important to know that the Kernel plays a vital part in managing the OS-9 operating system than to read 24 pages of what the Kernel does and how it manages to do what it does. For beginners, I like to keep things simple by speaking in broad terms, by saying, for instance, "the Kernel supervises the Operating System."

First off, OS-9 is an *operating system*, not a programming language, or even a program (not in the sense that it allows you to write a letter or calculate a row of figures). An operating system is what comes between the hardware and the software. It manages the software and directs the output to the hardware. That's about as simple as it can be stated. This diagram should help you see the relationship between the computer, its operating system and the applications for which it may be used:



The operating system manages program execution and computer control of hardware. By this definition, there even must be an operating system while operating under Disk Extended BASIC, and there is. The difference is that Disk Extended BASIC comes with a "transparent" operating system. It is wired into the BASIC ROM, leaving you with what appears to be a computer without an operating system. Do not let the appearance fool you. Disk Extended BASIC is a DOS (Disk Operating System).

Booting OS-9

Let's do something with OS-9. First, we'll make OS-9 control your Color Computer. To accomplish this feat, you must change from one operating system to another. This requires a machine language program to turn off the ROM for the 64K RAM mode, load the OS-9 operating system and execute the OS-9 Kernel. This is done on the Color Computer by one of two methods; the method used depends entirely on which version of Disk Extended BASIC you have. The two methods for booting are as follows:

1) For Disk Extended BASIC 1.0, place the boot disk in Drive 0 and type `RUN"*"`. You are prompted to select one of two options. You can either boot OS 9 or test the speed of your disk drive Type `B` for boot and wait for the Colo Computer to tell you when to chang disks and enter the OS-9 system disk.

2) If you have Disk Extended BASI 1.1 or newer, the procedure is consid erably easier. Put your system disk i Drive 0 and simply type in `DOS`.

Regardless of the method used, th computer sends the disk drive's rea head to Track 34 to start reading an program loaded on that track. Th program executes the procedures w talked about earlier, causing OS-9 t take over your Color Computer. your Color Computer.

If you have DOS 1.0 and want t upgrade, it's a simple and inexpensiv process. You do *not* have to buy a who new disk controller. All you need is or of the DOS ROM chips, available fro a number of suppliers for $39 or less.

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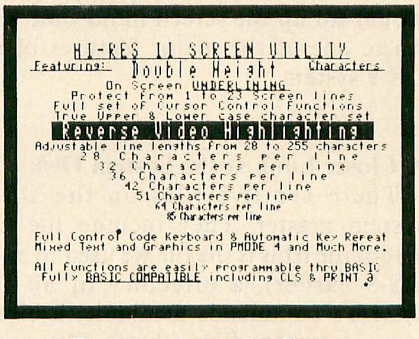

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Mixed Text and Graphics	Yes	Yes	Yes
Separate Text & Graphics	Yes	Yes	No
Print @ fully implemented	Yes	Yes	Yes
Print @ on all line lengths	Yes	Yes	51 only
Different line lengths	28 to 255 (9)	28 to 255 (9)	51 only (1)
Automatic Key Repeat	Yes	Yes	Yes
Adjustable Key Repeat	Yes	No	No
Auto Repeat Disable	Yes	No	No
Erase to end of line/screen	Yes	Yes	Yes
Home Cursor	Yes	Yes	Yes
Solid or Blinking Cursor	Yes	No	Yes
CLS command supported	Buff/Black	Buff/Black	Buff/Black
X.Y Coordinate Cursor Positioning	Yes	Yes	No
Double Size Characters	Yes	Yes	No
Individual/Continuous Highlighting	Yes	Yes	No
On Screen Underlining	Yes	Yes	No
Clear Key functional	Clear/L keys	Clear key	No
16.32 & 64K Supported	Yes	Yes	Yes
Green or Black Background Color	Yes	No	No
Dual Character sets for Enhanced 64 and 85 Characters per line display	Yes	No	No
Protected Screen Lines (programmable)	1 to 23	No	No
Full Control Code Keyboard for Screen control directly from the keyboard	Yes	No	No
Programmable Tab Character Spacing	Yes	No	No
Full Screen Reverse Function	Yes	Yes	No
Switch to & from the Standard 16 by 32 Screen for full compatability	Yes	No	No
On Error Goto Function	No	No	Yes
Extended Basic Required	No	Yes	Yes
All Machine Language Program	Yes	Yes	Yes
RAM Required in addition to Screen RAM	2K	2K	2K
Program Price (Tape)	$24.95	$19.95	$29.95

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bend any of the pins on the chip when inserting it. Close the case and replace the screw. Job complete.

What Time is it?

When booting OS-9 you are prompted to enter the time. OS-9 is very dependent on time and uses a clock for a number of functions. The format should be entered as requested. Spaces can take the place of punctuation marks, but all other spacing is required.

The future validity of the filing system depends on your entries. If you have a real-time clock (like the one available on the PBJ PC-Pak), you'll be able to add the time setting to the start-up procedure file by entering the year in the start-up file.

Unlike Disk Extended BASIC, OS-9 has two directories it works from at all times — the data directory and the execution directory.

If you haven't already done so, get out the *Getting Started With OS-9* booklet and make a backup copy of the OS-9 System disk. Your system master should only be used to make copies for personal use.

After entering the time, you are operating under OS-9. If you have never operated under an advanced operating environment, get ready for a unique experience.

Unlike Disk Extended BASIC, OS-9 has two directories it works from at all times — the data directory and the execution directory. When you boot OS-9, the data directory will be the ROOT directory on the OS-9 system disk. The execution directory will be contained within the CMDS directory on the same disk.

Just to make sure the screens we are viewing are set up for the same display, type in and enter `tmode -upc`. This command changes the display on the terminal (TV or monitor) from all uppercase to an upper- and lowercase display. Now your display will look the same as the examples.

To get a look at the current data directory, try typing the `DIR` command you may have used in Disk Extended BASIC and see what happens. After hearing your disk drive churn a bit, you should see a directory that looks like this:

```
DIRECTORY OF .   23:22:14
OS9Boot    CMDS      SYS
DEFS       startup
```

You can easily see that this is a directory, but OS-9 doesn't stop there. It continues by telling you it is a listing of the current data directory (indicated by the period). The time on your system should be different.

This looks a lot different from the directory you may be used to under Disk Extended BASIC, FLEX or Star-DOS. This is your OS-9 system disk with all its ROOT directory files. Directories are special files designed to help organize a disk that may contain 100 or more programs and files. Of course, you can also incorporate files that stand on their own, like the start-up file, but that would fill up the screen in no time and waste one of the major features of an OS-9 system.

A Closer Look at the System Disk

There are five files on the OS-9 system master. They include the OS 9Boot file (this is the file we used to boot OS-9 earlier), a directory of all the system's commands available, a directory of system files (things like passwords and message of the day), a directory of established procedures used by OS-9 assembly language programs and a start-up file.

As I said earlier, OS-9 has two default directories. As soon as you have booted OS-9, the system locates the directory on Drive 0 named CMDS and makes it the current execution directory.

Why Won't It Run?

At almost every meeting of the Northern Virginia Color Computer Club, w can expect one question to come up What I am about to say is the answe to that question. This may be the mos important thing you will ever lear about OS-9. Please pay *very* clos attention. OS-9 has an established. . . logical. . . order for locating program and procedures to be executed. Th order in which a procedure is searche is as follows:

1) If a complete pathlist is defined, th program/procedure is called from tha pathlist and immediately executed (complete pathlist would resembl /dO/cmds/dir).

2) If a complete pathlist is not defined, OS-9 looks for the program i memory. If the program/procedur called is located in memory, it is executed immediately.

3) The next place OS-9 looks for program is in the current executio directory. This has been a source c confusion for a great number of people Because of this, trying to run BASIC09 o C under OS-9 has resulted in creatin more errors than programs because yo have not copied BASIC09 or C from it master disk into the current executio directory. This is in large part becaus of the documentation you have received. If you want to find all of th programs in the current executio directory, type `dir x` and you should se a directory that looks like the followin example.

```
Directory  of .  06:21:22
asm        attr       backup
binex      build      cmp
cobbler    copy       date
dcheck     debug      del
deldir     dir        displa
dsave      dump       echo
edit       exbin      FORMAT
free       ident      link
list       load       login
makdir     mdir       merge
mfree      os9gen     printe
procs      pwd        pxd
rename     save       setime
shell      sleep      tee
tmode      tsmon      unlink
verify     xmode
```

This directory shows all of the proc dures available from OS-9.

4) Finally, OS-9 will look for th program as a listing of batched proc dures in the current data directory. procedure is a line you type from th OS-9 prompt. Any number of proc dures can be put in a procedure fil

We'll go into procedure files a little later.

A Note on Control Keys

There are a number of standards that have been set in the computer industry, some of which are missing on the Color Computer. The most noteworthy is the lack of two keys, the CONTROL and ESC keys. Both of these are available in OS-9.

Since OS-9 has no need for the CLEAR key, it takes the place of the CONTROL key, and ESC is accomplished by holding down the CONTROL (CLEAR) key and pressing the BREAK key. If you ever want to get out of executing a program, the ESC is your "ESCape."

Ready to Climb a Tree?

Ready for a little tree climbing? Of course, I mean climbing the OS-9 operating system of tree directories. From here on we will discuss the directory system: how to get into them, how to get out of them, how to create them, how to tell where you are in them and how to delete them.

Just to make sure we're in the right mode, type in the command to change the terminal to the upper- and lowercase mode. If you don't remember how to change to the upper- and lowercase mode, try typing in the following command and see what happens when you enter the dir command: `TMODE -UPC`. The directory should look something like the following example.

```
Directory of .   22:53:47
OS9Boot   CMDS        SYS
DEFS      startup
```

What's in a File?

Before we go too much further, let's look at how you can tell the difference between directories and files in a *well-organized* OS-9 system. Notice that the start-up file is displayed in all lowercase, the OS9Boot file is in upper- and lowercase, and the remainder of the files is displayed in all uppercase.

The TMODE command alters the mode of the device it is directed to change (in this case the display on your TV or monitor) and the -upc means to turn off the all uppercase display. Now there is an upper- and lowercase display, and your Color Computer will display the directories with some degree of logic, provided the rules of file naming are followed.

Here are the rules: 1) Name all directories with all uppercase characters; 2) Name other files with any combination of upper- and lowercase characters.

This is a marked improvement over a number of other operating systems (especially a certain three-letter company that claims to be the leader in the computer industry). Both FLEX/*Star-*DOS and MS-DOS do not permit the use of lowercase characters in filenames! FLEX/Star-DOS does not permit the use of directories, either.

Another item worth noting is that filenames in OS-9 are not limited to the traditional eight characters found in FLEX, Star-DOS, MS-DOS or Disk Extended BASIC. With OS-9 you are "limited" to names that are one to 29 characters long. Just imagine the luxury of a filename that tells exactly what's in the file!

If these rules are followed, you'll know what to expect from any filename simply by looking at its name.

Even More than You Want to Know

OK, so you're not all that organized yet. Neither are too many of the rest of us (there is a naming mistake on your original disk if you look in the CMDS directory). Therefore, OS-9 was developed with an extension of the directory command to allow a second look at any directory and find out what is in it. This time type in the following line: `dir e`.

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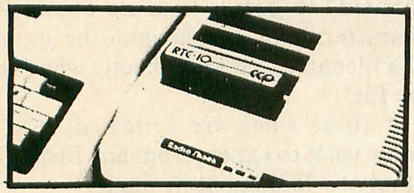

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Now you should see a directory that looks very much like this one:

```
Directory of .  20:02:29

CREATED ON    OWNER  NAME
  ATTR       START        SIZE
============================
83/06/02 1921     0  OS9Boot
-------wr        A      3032
83/06/02 1956     0  CMDS
d-ewrewr      3C        620

83/06/02 2002     0  SYS
d-ewrewr      164          A0
83/06/02 2002     0  DEFS
d-ewrewr      17F          C0
```

The 'e' tells OS-9 you want to know *everything* about the directory, and it tells you everything! For thoroughness, we'll look at the information for the CMDS directory. It was created on June 2, 1983 at 7:56 p.m. The owner of the file is the *super user*. The file is named CMDS. Then, we see a crazy section of the line, d-ewrewr, which we'll cover in the next paragraph. The START is the physical sector on the disk where the beginning of the file is located, and the SIZE is the number of sectors used by the file on the disk.

The eight characters used to identify the file attributes are code letters. Each column must contain either a hyphen (-), for not selected, or one specific letter. The meaning of each letter is as follows:

Column	Letter	Meaning
1	D	File is a directory of other files
2	S	File may be shared by more than one user
3	E	File may be executed by anyone
4	W	File may be written to by anyone
5	R	File may be read by anyone
6	E	File may be exected by owner and super user
7	W	File may be written to by owner and super user
8	R	File may be read by owner and super user

Value in Directories

Now that you have discovered how to identify a file, what makes these directories so valuable? Let's look at a good example of a disk used by a writer.

This example is typical of many writers in the computer industry. Many of us write for a number of publications. Because of this we need a system tha is well-organized.

Making a Directory

My ROOT directory contains number of files not found on the orig inal OS-9 disk. In addition, I hav included the following:

```
FOR_RAINBOW
FOR_SOFTNEWS
FOR_NAVY
RGS_MANUALS
PERSONAL_FILES
```

To create these files on my disk, I us the MAKDIR command. Starting fror the top, I have typed the following line (To create the "underline character," a in `FOR_RAINBOW`, press the CLEAR an minus sign (-) keys simultaneously.)

```
makdir FOR_RAINBOW
makdir FOR_SOFTNEWS
makdir FOR_NAVY
makdir RGS_MANUALS
makdir PERSONAL_FILES
```

Now my directory looks like this:

```
 Directory of .  12:50:55
OS9Boot   CMDS       SYS
DEFS      startup    FOR_RAINBOW
FOR_SOFTNEWS         FOR_NAVY
RGS_MANUALS          PERSONAL_FILE
NVCCC_NEWSLETTER
```

Before you start wondering how I ca put so much on one disk, I've added five-meg hard disk drive to my 'E' boar CoCo since I last wrote for RAINBOW.

Going out on a Limb

Since this is an article for RAINBOW let's look inside the FOR_RAINBOV directory. To get inside it, we must firs change our data directory. This is don by using the CHD command:

```
chd for_rainbow
```

Notice the directory name does not hav to be typed in all uppercase after it ha been created. This saves a lot of tim and avoids a lot of mistakes.

The directory now looks like this:

```
 Directory of .  13:00:45
COVER_LETTERS      ARTICLES
REVIEWS    CONTACTS
```

Notice that these still are all directorie (all capital/uppercase letters). So we' change again. This time, change to th articles directory; type `chd article` This directory looks a little more useful

```
 Directory of .  13:10:15
OS9_intro OS9_directories
SCRATCH03
```

This directory also shows one of th ways in which OS-9 uses various files The SCRATCH03 files is not a perman ent file. It is created by *DynaStar* t hold the file until a session is completed

When finished, the old file is deleted and the scratch file becomes the new file. The final product is named the same as the old file.

Now that these directories have been created, and we are somewhere down in the holes of a directory, how do we find out where we are? Let OS-9 tell us! Try typing in the following:

```
pwd
```

The command stands for "print working directory." It gives a listing of the current working directory; mine looks like this:

```
/HO/FOR_RAINBOW/ARTICLES
```

It says that I am using device HO (the leading slash means it is a device) in the FOR_RAINBOW directory and further in the subdirectory ARTICLES.

Retracing our Steps

When an article is finished, you should always have a cover letter to go with it, so you'll want to back out of the current directory. OS-9 allows you to do this by using shorthand. The period (.) indicates one directory level. One period is the current level, two is one level higher, three is another level higher, and so on. There is no reasonable limit to the number of periods used. Now type:

```
chd ..
```

This goes back to the FOR_RAINBOW directory, which looks like this:

```
 Directory of .  13:45:18
COVER_LETTERS      ARTICLES
REVIEWS    CONTACTS
```

A third period will take you up to the ROOT directory (one level higher).

Even with five-meg of online storage, everything can't be kept on the system at one time. To help solve the problem of storage, copy old files over to another disk for historical storage and delete them from the working disk.

Suppose you decide to delete a directory that's no longer needed. You can start by deleting every file in the directory, then delete the directory, or simply delete the directory. This is done with the DELDIR command followed by the name of the directory to be deleted. As an example, from inside the FOR_RAINBOW directory, type `del dir contacts`.

After answering the series of questions as prompted, you can again type the directory command and see something like the following.

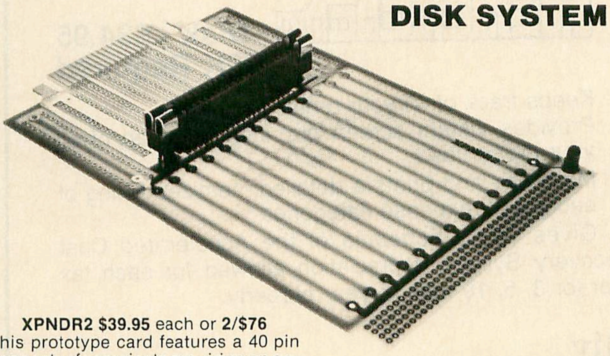
```
 Directory of .  14:00:27
COVER_LETTERS          ARTICLES
REVIEWS
```

With a little foresight, you'll see how a file can easily be organized. If there are several family members who use the computer, directories can be made for each member. If you have a business and also use the computer for personal use, subdirectories can be made for personal and business use.

As promised at the onset of this article, we've covered directories in the OS-9 operating system. With this information, you will be able to get a lot of mileage out of a single disk (and even more from a hard disk drive). With directories, you should now know how to get into them, get out of them, create them, tell where you are in them and delete them.

Enjoy what you have learned about getting started with OS-9. OS-9 can help make the most of your Color Computer. ☐

XPNDR2
for the CoCo
DISK SYSTEM



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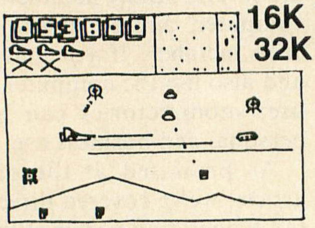

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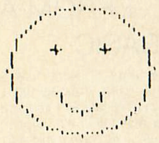

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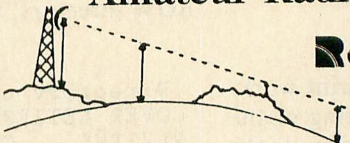

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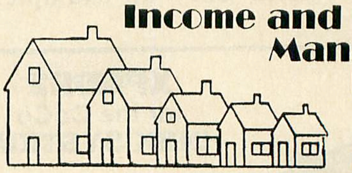

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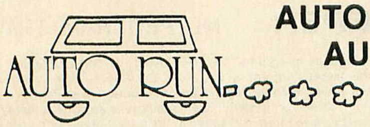

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Old English Cartoon Gay Nineties

Tape 2

Broadway

Broadway

Broadway
Broadway-reduced
Broadway-reverse
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Tape 3

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Business

Business
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Business-reverse
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CoBBS:

Setting Up Various Files To Make The System Operate

By Richard Dunca

Welcome back! For the past two months we have been looking at the bulletin board software and what makes it tick. This month we will use the editors required to set up the various files that make *CoBBS* operate.

System Control File Editor

The System Control File Editor (*SCF/EDI*) is the first editor to use in setting up the system. This editor creates a file that tells the system certain functions. The editor file is stored on disk in an open area of the directory file so no additional disk space is used. Upon loading and executing the editor, you are asked a group of questions.

1) LOG-ON TYPE? This specifies how far you want a new caller to get on the system.

Type 1 — No access unless the user has an entry in the userlog.
Type 2 — User may register if not in the userlog but will not be able to access the main system.
Type 3 — Operates like Type 2. User is shown *NEW USER/TXT* if available.
Type 4 — User may register if not in the userlog and have access to the main board.

2) MENU TO ENTER IN? This is the menu that will be loaded when a user gets past logon. This menu number is initially set in the user's log entry when first logging on. This may later be changed by the user through the Menu Control Editor.

3) NEW USER TIME-OUT? This sets the time a new user is allowed to use the system. The value may be from zero to 255. Time is figured as five minutes times the value, so four, for instance, would be 20 minutes.

4) NEW USER PRIVILEGE? Sets the privilege level of a new user. May be any value from zero to 255.

5) NEW USER P1 FLAGS? Sets any flags desired for a new user. Reply with the actual set of flags, such as "00000000." Only a '0' and/or '1' is allowed.

6) NEW USER P2 FLAGS? Same as P1 flags, except this is for the last eight of 16 flags.

7) CHECK FOR MESSAGES? If answered "yes," the system checks to see if there are any messages on the syster for that user after logging in and befor loading the main board routine. I answered "no," then this routine i skipped and the system goes directly t the main board routine after logging i the user.

8) USER PROMPT? Sets the ne user's prompting level. Refer to th information on the Menu Control Editor for the different prompts.

9) TRACE USER'S OPERATION The tracer option maintains a log of user's operation while on the systen The file to which the information i printed is determined by this flag. Th options are:

0 — No trace
1 — Cassette (reserved)
2 — Disk drive
3 — Printer (available if using th Pak)

10) DRIVE FOR HDR/SYS? Specify which drive the message header is o

11) DRIVE FOR MSG/SYS? Specify which drive the message text is on.

12) DRIVE FOR USERL/SYS Which drive for the userlog.

13) DRIVE FOR MENU/SYS Drive for the board's menu file.

14) DRIVE FOR TRACER/SYS Drive for the system's trace file if use

15) DRIVE FOR REGISTER/SYS Drive for registration file.

(Richard Duncan is a broadcast technician for WMC-TV in Memphis, Tenn. His first CoCo was one of the units introduced to the dealers in Dallas. He is active in amateur radio (WB5CNV) and especially interested in packet communications. Richard lives in West Memphis, Ark.)

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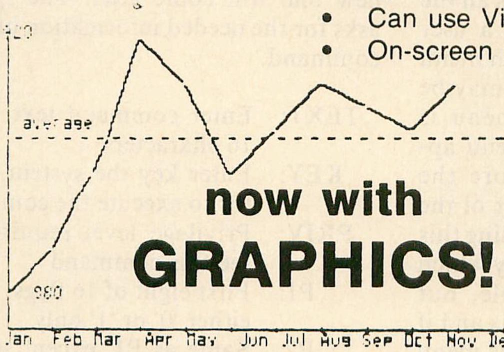

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After answering all questions, the system shows all the selections. If they are correct, the file is saved to the disk's directory. This will be the system disk that *must* be in Drive 0. Any disk used for the system in Drive 0 must have a control file on it or the program will not run.

To save a file, type `YES` at the first prompt, "Ready to Save?" Insert the disk that will be the Drive 0 system disk. At the next prompt, "Ready to Save?" type `Y` and ENTER. You now have your system parameters for the system. These can easily be changed by running *SCF/EDI* again.

System Menu File Editor

The next step is to use the System Menu File Editor (*SMF/EDI*) to set up the various menus. Note: To use any editor other than *SCF/EDI* you must have booted up the system as far as the start-up file. Error trap and *COTERM* must be in memory. Also, before running any of the editors locally, type `POKE 4658,0` before running or the system will try to reboot.

> ". . . *there should always be a menu zero, with zero privilege and no flags set. This prevents a user from having difficulty upon certain system errors*"

The menu control file contains all the information needed to present a user with a choice of commands. Each menu has a number, and the number may be from zero to 255. When a menu is printed, the number of that menu appears with its name just before the various commands. The number of the menu appears in asterisks (*). Using this editor the system is told not only which commands should be available, but what the privilege requirement is and if a user flag must be set to see this menu or command.

To be safe, there should always be a menu zero, with zero privilege and *no* flags set. This prevents a user from having difficulty upon certain system errors or errors in setting up the new user privileges.

Upon loading and running the program the following menu appears:

```
1) Create a new menu
2) Edit existing menu
3) Exit editing
4) Return to BBS
```

1) Create a new menu — Choosin
this option allows the SysOp to creat
a menu. The system will ask if you desir
to kill the old menu file. If answere
"yes," the complete menu file is delete
with all menus. After answering th
prompt the editor's menu appears.

2) Edit existing menu — This func
tion allows the SysOp to edit any men
in the file. If an improper menu numbe
is given, then the first menu reappears

3) Exit editing — Exits *SMF/ED*
and goes into BASIC.

4) Return to BBS — Exits *SMF*
EDI, loads and runs the main boar
system.

After passing the first menu th
SysOp is presented with the edito
menu. The following menu appears:

```
#(menu)              (menu name)
COMMANDS:  (number)
1) ADD A COMMAND
2) CHANGE A COMMAND
3) LIST MENU
4) ADD/CHANGE BOARD MENU
5) LIST/EDIT HEADER
6) DELETE A COMMAND
7) EXIT AND WRITE
8) EXIT
```

The first step is actually Function 4, bu
we will look at them in the order listec

1) ADD A COMMAND — Afte
choosing this, the system asks for IN
SERT AFTER:. Pressing 'L' adds th
command to the end of the list, or th
SysOp may specify which command th
new one will come after. The syster
asks for the needed information of eac
command.

TEXT:	Enter command text up t 16 characters
KEY:	Enter key the system look for to execute the comman
PRIV:	Privilege level required t see this command
P1:	First eight of 16 flags. Ent either '0' or '1' only
P2:	Same as P1, except secon eight flags
TYPE:	Type of command
DATA:	Optional data required b some commands

2) CHANGE A COMMAND — Tl
function allows editing of a comman
You are asked which command numb
you wish to edit. While the variou

ommand information is presented, ressing ENTER retains the original ntry while typing new information eplaces the original.

3) LIST MENU — Allows the listing f each command or the text as it ppears on the system under full text rompting. While looking at the various full command listing, use a 'Q' to xit the listing, or any key to continue the next one.

4) ADD/CHANGE BOARD IENU — Option 4 determines what ienu number is entered and whether it a new one or change menu number nd retains all commands. The privilege vel and flags set those values for that articular menu. A user must meet or xceed these specifications to be able to ccess it. When asked if the board is ostable, the system sets a flag to tell the oard program whether or not the ienu may be listed as one that may ave a message posted to it in reply or s a new message. This prevents the ossiblilty of a user who has access to iat menu from posting a message to it there is no read command available or the number.

5) LIST/EDIT HEADER — This inction lifts the menu header text and so allows modification of that text.

6) DELETE A COMMAND — Detes a command from the list. The ommand is shown and verification equested before deleting the command.

7) EXIT AND WRITE — Exits the litor and writes the new or modified ienu to the menu control file. Returns the first menu.

8) EXIT — Exits the editor and eturns to the first editor menu. No data the menu file is modified.

Use command #4 first when setting a menu, then use the #1 command add whatever commands you want that menu. Pressing 'L' adds the ommand to the end of the list. Determine which command you want on each enu. After pressing the ADD function, you are asked the text to display, e key character to look for, privilege, ags to set (if any), the type of command and then the optional data, which ay or may not be needed depending the particular type of command. The ther commands are for modifying, leting, saving, etc. A program to set a simple menu file automatically is ailable on my BBS.

serlog Editor

The System Userlog Editor (*SUL/DI*) is used to modify a user's privilege r other pertinent information. Upon loading and running the editor the following menu appears:

```
              USERS: (NUMBER)
<S>EARCH               <G>O TO USER #
<N>EXT                 <L>AST ENTRY
<M>ODIFY FIELD         <R>EGISTER
<A>CTIVATE             <D>ELETE
<P>RINT LISTING        <B>ACKUP
<E>NTER USER           <U>SER CLASS
<Q>UIT                 <H>ARD COPY
COMMAND>
```

Note: A user's information must be initially printed on the screen before any modifications may be made.

<S>EARCH — Searches for a user by string comparison. After pressing the 'S' the system prompts for the test string. The test string may be any target in the name or from. Use SHIFT-CLEAR to separate name and from in text string.

<G>O TO USER # — Jumps to user specified. The user number changes when the userlog is backed up and there are deleted entries.

<N>EXT — Goes to the next user in the log.

<L>AST ENTRY — Goes to the previous user in the log.

<M>ODIFY FIELD — Used to change one of the user listings information. Some listings may not be modified. After choosing 'M' the system asks for field to be modified (see the section on field modification).

<R>EGISTER — Sets the registration flag where the user is classified as either a New, Probationary or Registered user. This has no bearing on the operation of the system for that user as all those controls are in the command and user privilege information, but the user may be shown a text file at logon that only new users will see.

<A>CTIVATE — "Undeletes" a user from the log if deleted by accident.

<D>ELETE — Flags a user to be deleted from the log the next time a backup is performed.

<P>RINT LISTING — Prints the user's record on the screen and shows all pertinent information in his file.

<B>ACKUP — Backup userlog file. Copies entries over to the file *USERL/BAK*. While copying, the system will not copy over any entries that are flagged to be deleted. The system asks if you desire to delete and copy the new file over to the system's userlog file, *USERL/SYS*.

<E>NTER USER — Allows entering a user into the log without that user having to call the system and register.

<U>SER CLASS — Not used at this time.

<Q>UIT — Exit the editor.

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See Rainbow review September issue.

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<H>ARD COPY — Prints the full userlog entries to the printer.

A user's information must be initially printed before any modification can be done. This is normally done except when first running the editor.

When choosing the <M>ODIFY option, the system asks for which field to be modified. A user's entry is formatted as follows:

USER # (number of record)
- A) user name
- B) password
- C) calling from
- D) registration flags
- E) privilege level
- F) number of times called
- G) first 8 user flags
- H) second 8 user flags
- I) initial log on menu #
- J) not used
- K) not used
- L) user prompting level
- M) time out value
- N) not used
- O) last msg received
- P) caller # on last call
- Q) last time on

Choosing one of the fields to modify the system prints the original data. If ENTER is pressed by itself, the data is not changed; while typing the modifications that data is modified. Not all entries can be modified. The user's listing need not be printed out after each modification. After performing a modification the SysOp is returned to the COMMAND> prompt and may perform any of the valid commands. The command help table may be printed by pressing '?'.

How a user is upgraded depends on how you have the system set up and how much access you want that user to have. With the simple menu system included, to upgrade a caller to a normal user's access (Leave messages) you modify the privilege and upgrade it to 30. You would also like to show him registered, so use the 'R' command and choose the type of user you want him to be (New, Probationary or Registered).

System Message Purge

This routine is used to eliminate the deleted messages from the message base file as it grows in size. The routine is self-prompting and really does not need any additional information.

Booting up

Your modem must be an auto-answer modem. Some manuals mention a special setup for the CoCo, but you should ignore this. When using the Pak, you operate like the Model III and many other systems. The main thing is that you set the modem to be controlled by the DTR line as this is the line that hangs up the modem. If you have a Modem II, you should check out CompuServe or another system using that modem, as it does require some changes to the system that I do not have.

The first step in getting the system up is to initialize the Drive 0 disk with *SCF/EDI*, then set up the menu file with *SMF/EDI*. Next, get the system into 64K mode, type `PCLEAR1`, and load and run *STARTUP/BAS*. Everything is self-prompting from there. You enter the date/day/time, whether or not you want the system protected (for CoCo I's) and then if you want the C/R mod.

The protection causes the modem to hang up if the BBS goes into BASIC any way other than under a command. The other modification is actually done to the driver routine and, if installed, modifies it so a `CHR$(13)` is the output when there is no carrier detect. If using 1200 Baud, this is required and is good at anytime to make certain the system reboots if a carrier is lost while in use. But, when installed, it also means you cannot break into BASIC without removing it. This is handled anytime you properly go into BASIC from the standby screen, or exit into BASIC with one of the commands. Logging on locally from the keyboard requires that you first remove the modification (SHIFT-up arrow at the standby screen) then `RUN` the program and use it normally. Another way is to use the SHIFT-up arrow and type `POKE 4658,0:CONT`. To reinstall the modification from BASIC, type `GOTO10000` in either *USER/SYS* or *COBBS/SYS*.

If you have initialized all the disk correctly, created a menu file and booted up with *STARTUP/BAS*, you are now ready for a call. We have covered in this installment (and the preceding two) all the files required to get *CoBBS* up and running. Because of the space limitation there was not much room to get into a detailed discussion of the board operation, but with a little experimentation you should be able to get everything going. Take everything one step at a time rather than trying to get a "full-blown" system up at once.

If you have questions, give one of the CoBBS boards around the country a call. My BBS number is (501) 735-5614. If desired, I will provide a disk with all the files on it along with an additional documentation disk for $25. You can write me at 2504 N. Gathings Drive, West Memphis, AR 72301. ☐

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70	207
97	129
130	91
1030	10
1050	251
3030	253
4045	132
5000	55
END	96

Listing 1: `SCF EDI`

```
0 '-SCF/EDI <C> 1985 BY RICHARD
DUNCAN
5 CLEAR1000:DIM SY$(50)
10 CLS:PRINT:PRINT
20 PRINTTAB(5);"SYSTEM CONTROL E
DITOR"
30 PRINT:PRINT
40 PRINT"LOG-ON TYPE <4>: ";:GOS
UB650:CH=VAL(CH$):SY$(1)=CH$:IFC
H>4THEN40ELSEIFCH=0 THEN SY$(1)=
"4"
50 PRINT"MENU TO ENTER IN <0>: "
;:GOSUB650:CH=VAL(CH$):SY$(2)=CH
$:IFCH>255ORCH<0THEN50ELSEIFCH$=
""THENSY$(2)="0"
55 PRINT"NEW USER TIME OUT <4>:
";:GOSUB650:CH=VAL(CH$):IFCH>255
THEN55ELSESY$(3)=CH$:IFSY$(3)=""
THENSY$(3)="4"
60 PRINT"NEW USER PRIVILEGE <25>
: ";:GOSUB650:CH=VAL(CH$):IFCH<0
ORCH>255THEN60ELSESY$(4)=CH$:IFC
H$=""THENSY$(4)="25"
65 PRINT"NEW USER FLAG 1 <000000
00>: ";:GOSUB650:IFLEN(CH$)<>8TH
EN65ELSESY$(5)=CH$
67 FORA=1TO8:X$=MID$(CH$,A,1):IF
X$="1"ORX$="0"THENNEXTA:ELSE65
70 PRINT"NEW USER FLAG 2 <000000
00>: ";:GOSUB650:IFLEN(CH$)<>8TH
EN70ELSESY$(6)=CH$
72 FORA=1TO8:X$=MID$(CH$,A,1):IF
X$="1"ORX$="0"THENNEXTA:ELSE70
74 PRINT"NEW USER PROMPTING <1>:
 ";:GOSUB650:IFCH$=""THENSY$(7)=
"1"ELSECH=VAL(CH$):IFCH<1ORCH>4T
HEN74ELSESY$(7)=CH$
75 PRINT"CHECK FOR MESSAGES? <Y>
 ";:GOSUB650:IFCH$=""THENSY$(8)=
"Y"ELSEK=INSTR("YyNn",CH$):IFK>2
THENSY$(8)="N"ELSE75
80 PRINT"TRACE USER'S OPERATION?
 <2> ";:GOSUB650:IFCH$=""THENCH$
="2"ELSEIFLEN(CH$)<>1THEN80ELSEC
H=VAL(CH$)
82 IFCH>3THEN80ELSESY$(9)=CH$
85 PRINT"SECURITY PASSWORD? <Y>:
 ";:GOSUB650:IFCH$=""THENSY$(10)
="Y"ELSEK=INSTR("YyNn",CH$):IFK=
0THEN85ELSEIFK<3THENSY$(10)="Y"E
LSESY$(10)="N"
90 PRINT"REGISTER NEW USERS? <Y>
 ";:GOSUB650:IFCH$=""THENSY$(11)
="Y"ELSEK=INSTR("YyNn",CH$):IFK=
0THEN90ELSEIFK<3THENSY$(11)="Y"E
LSESY$(11)="N"
95 PRINT"DISPLAY NEWUSER/TXT? <Y
> ";:GOSUB650:IFCH$=""THENSY$(12
)="Y"ELSEK=INSTR("YyNn",CH$):IFK
=0THEN95ELSEIFK<3THENSY$(12)="Y"
ELSESY$(12)="N"
97 PRINT"DISPLAY POSTLOG/TXT? <Y
> ";:GOSUB650:IFCH$=""THENSY$(13
)="Y"ELSEK=INSTR("YyNn",CH$):IFK
=0THEN97ELSEIFK<3THENSY$(13)="Y"
ELSESY$(13)="N"
100 PRINT"BLANK IDLE SCREEN? <Y>
 ";:GOSUB650:IFCH$=""THENSY$(14)
="Y"ELSEK=INSTR("YyNn",CH$):IFK=
0THEN100ELSEIFK<3THENSY$(14)="Y"
ELSESY$(13)="N"
110 PRINT"MESSAGE HEADER DRIVE <
0>: ";:GOSUB650:CH=VAL(CH$):IFCH
<0ORCH>3THEN110ELSESY$(15)=CH$:I
FCH$=""THENSY$(15)="0"
115 PRINT"MESSAGE TEXT DRIVE <0>
: ";:GOSUB650:CH=VAL(CH$):IFCH<0
ORCH>3THEN115ELSESY$(16)=CH$:IFC
H$=""THENSY$(16)="0"
120 PRINT"USERLOG DRIVE <0>: ";:
GOSUB650:CH=VAL(CH$):IFCH<0ORCH>
3THEN120ELSESY$(17)=CH$:IFCH$=""
THENSY$(17)="0"
125 PRINT"BOARD MENU DRIVE <0>:
";:GOSUB650:CH=VAL(CH$):IFCH<0OR
CH>3THEN125ELSESY$(18)=CH$:IFCH$
=""THENSY$(18)="0"
130 'PRINT"CALLER LOG DRIVE <0>:
```

Hint . . .

Machine Language Offset Loading

If you want to load an ML file at a location higher than the addresses in the file, type the command `CLOADM` (or `LOADM` for disk) `"filename"`, (new address-old address). If you want to load a file at a lower location, type the command `CLOADM` (or `LOADM`) `"filename"`, (new address-old address)+65536.

```
";:GOSUB650:CH=VAL(CH$):IFCH<0O
RCH>3THEN130ELSESY$(19)=CH$:IFCH
$=""THENSY$(19)="0"
135 IFVAL(SY$(9))=2THENPRINT"SYS
TEM TRACE DRIVE <0>: ";:GOSUB650
:CH=VAL(CH$):IFCH<0ORCH>3THEN135
ELSESY$(20)=CH$:IFCH$=""THENSY$(
20)="0"
140 IFSY$(11)="Y"THENPRINT"REGIS
TER DRIVE <0>: ";:GOSUB650:CH=VA
L(CH$):IFCH<0ORCH>3THEN140ELSESY
$(21)=CH$:IFCH$=""THENSY$(21)="0
"
500 GOTO1000
650 '-LINE INPUT-
655 LINEINPUTCH$:RETURN
675 GOSUB655:G1$="":IFCH$=""THEN
RETURN
680 FOR G=1 TO LEN(CH$)
685 G1=ASC(MID$(CH$,G,1)):IFG1>9
6ANDG1<123THEN G1=G1-32
690 G1$=G1$+CHR$(G1):NEXTG:CH$=G
1$:RETURN
1000 '
1005 CLS:PRINT:PRINT
1010 PRINT"LOG ON TYPE: ";SY$(1)
1015 PRINT"MENU ENTRY: ";SY$(2)
1020 PRINT"NEW USER TIME OUT: ";
SY$(3):PRINTTAB(10)"MINUTES:";5*
VAL(SY$(3))
1025 PRINT"NEW USER PRIVILEDGE:
";SY$(4)
1030 PRINT"NEW USER FLAG 1: ";SY
$(5)
1035 PRINT"NEW USER FLAG 2: ";SY
$(6)
1040 PRINT"NEW USER PROMPTING: "
;SY$(7)
1045 PRINT:PRINT
1050 PRINT"<Q>UIT TO RESTART ";:
GOSUB650:IFLEFT$(CH$,1)="Q"THENR
UN
1055 CLS:PRINT:PRINT
1060 PRINT"CHECK MESSAGES: ";:IF
SY$(8)="Y"THENPRINT"YES"ELSEPRIN
T"NO"
1065 PRINT"TRACER: ";SY$(9)
1070 PRINT"SECURITY PASSWORD: ";
:IFSY$(10)="Y"THENPRINT"YES"ELSE
PRINT"NO"
1075 PRINT"REGISTER USERS: ";:IF
SY$(11)="Y"THENPRINT"YES"ELSEPRI
NT"NO"
1080 PRINT"NEW USER TEXT: ";:IFS
Y$(12)="Y"THENPRINT"YES"ELSEPRIN
T"NO"
1085 PRINT"POST LOG TEXT: ";:IFS
Y$(13)="Y"THENPRINT"YES"ELSEPRIN
T"NO"
```

```
1090 PRINT"BLANK IDLE SCREEN: ";
:IFSY$(14)="Y"THENPRINT"YES"ELSE
PRINT"NO"
1095 PRINT:PRINT"<Q>UIT OR <ENTE
R>";:GOSUB650:IFLEFT$(CH$,1)="Q"
THENRUN
1100 CLS:PRINT:PRINT
1105 PRINT"HEADER DRIVE: ";SY$(1
5)
1110 PRINT"TEXT DRIVE: ";SY$(16)
1115 PRINT"USERLOG DRIVE: ";SY$(
17)
1120 PRINT"BOARD MENU DRIVE: ";S
Y$(18)
1125 'PRINT"CALLER LOG DRIVE: ";
SY$(19)
1130 PRINT"TRACE DRIVE: ";SY$(20
)
1135 PRINT"REGISTER DRIVE: ";SY$
(21)
1140 PRINT:PRINT"<Q>UIT OR <ENTE
R>";:GOSUB650:IFLEFT$(CH$,1)="Q"
THEN RUN
3000 '-SAVE SYSTEM CONTROLS
3005 CLS:PRINT:PRINT
3010 PRINT"ABOUT TO SAVE FILE!!!
"
3015 PRINT:PRINT"INSERT SYSTEM D
RIVE ZERO"
3020 PRINT"DISK IN DRIVE ZERO. T
HIS"
3025 PRINT"FUNCTION WILL WRITE T
O TRACK"
3030 PRINT"17 SECTOR 18 AND MUST
 BE"
3035 PRINT"THERE FOR COBBS TO OP
ERATE."
3040 PRINT:PRINT:PRINT"READY TO
SAVE? <YES/NO> ";:GOSUB650
3045 IFCH$="YES"THEN4000
3050 CLS:PRINT:PRINT:PRINT
3055 PRINT"1 - RESTART":PRINT"2
- SAVE FILE":PRINT"3 - END"
3060 PRINT" >";:GOSUB650:CH=VAL(
CH$)
3065 IFCH<1ORCH>3THEN3050
3070 ON CH GOTO 3075,3000,3080
3075 RUN
3080 UNLOAD:END
4000 '-SAVE FILE.....
4005 '
4010 CLS8
4015 PRINT@229,"INSERT COBBS SYS
TEM DISK";:GOSUB650
4020 CLS3:PRINT@233,"READY TO SA
VE";:GOSUB650
4025 IFLEFT$(CH$,1)<>"Y"THEN3000
4030 CLS0:PRINT@235,"PROCESSING"
;
```

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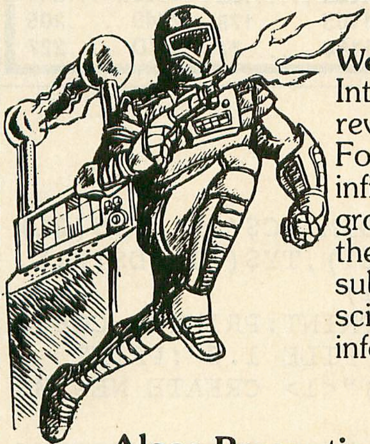

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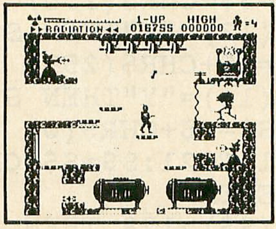

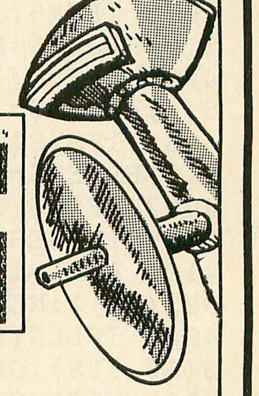

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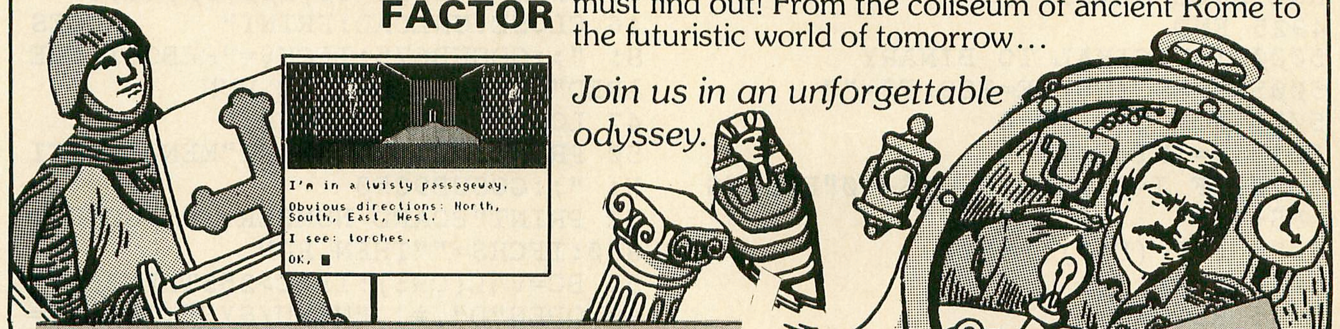

I'm in a twisty passageway.

Obvious directions: North, South, East, West.

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```
4035 S$="COBBS11A"
4040 FOR A=1TO4:S$=S$+CHR$(VAL(S
Y$(A))):NEXTA
4045 F$=SY$(5):GOSUB5040:S$=S$+F
$
4050 F$=SY$(6):GOSUB5040:S$=S$+F
$
4055 S$=S$+CHR$(VAL(SY$(7)))
4060 IFSY$(8)="Y"THEN S$=S$+CHR$
(255)ELSE S$=S$+CHR$(0)
4065 S$=S$+CHR$(VAL(SY$(9)))
4070 IFSY$(10)="Y"THEN S$=S$+CHR
$(0)ELSES$=S$+CHR$(255)
4075 IFSY$(11)="Y"THEN S$=S$+CHR
$(0)ELSES$=S$+CHR$(255)
4080 IFSY$(12)="Y"THEN S$=S$+CHR
$(0)ELSES$=S$+CHR$(255)
4085 IFSY$(13)="Y"THEN S$=S$+CHR
$(0)ELSES$=S$+CHR$(255)
4090 IFSY$(14)="Y"THEN S$=S$+CHR
$(255)ELSES$=S$+CHR$(0)
4100 FORA=15TO21:S$=S$+CHR$(VAL(
SY$(A))):NEXTA
4900 IFLEN(S$)>128 THEN S1$=LEFT
$(S$,128):S2$=RIGHT$(S$,LEN(S$)-
128) ELSE S1$=S$:S2$=STRING$(127
,233)
4905 CLS4:PRINT@232,"SAVING DATA
";
4910 DSKO$ 0,17,18,S1$,S2$
4920 CLS:PRINT:PRINT"SYSTEM CONT
ROL FILE SAVED."
4925 END
5000 '-DECIMAL TO BINARY
5005 F=ASC(F$):E=128:F$=""
5010 FOR Q=1 TO 8
5015 J=INT(F/E)
5020 IF J=0 THEN F$=F$+"0"ELSEF$
=F$+"1"
5025 F=F-(E*J):E=E/2
5030 NEXT Q
5035 RETURN
5040 '-BINARY TO DECIMAL
5045 E=1:F=0
5050 FOR Q=8 TO 1 STEP -1
5055 IFMID$(F$,Q,1)="1"THEN F=F+
E
5060 E=E*2:NEXTQ:F$=CHR$(F)
5065 RETURN
```

75	74		
120	149	1250	25
216	200	1340	169
635	46	1525	116
1022	25	1660	248
1105	178	2040	205
1160	77	END	227

Listing 2: `SMF EDI`

```
10 CLEAR5000:DIM BC$(21),PR$(21)
,P1$(21),P2$(21),TY$(21),D$(21),
KY$(21),TX$(21)
20 CLS:PRINT:PRINT:PRINT"  COBBS
 MENU CONTROL FILE 1.0":PRINT
25 PRINTTAB(5)"<1> CREATE NEW ME
NU"
30 PRINTTAB(5)"<2> EDIT EXISTING
 MENU"
35 PRINTTAB(5)"<3> EXIT EDITING"
:PRINT"      <4> RETURN TO BBS"
40 GOSUB600:A=VAL(CH$)
45 ON A+1 GOTO 40,200,50,46,47
46 CLOSE:UNLOAD:PRINT"      ACCES
S: ";:GOSUB675:IFCH$="REBOOT CLE
ARED" THEN END ELSE RUN
47 LOAD"COBBS/SYS",R
50 PRINT:PRINT:'PRINT"MENU PREFI
X: ";:GOSUB9850
52 PRINT"BOARD NUMBER: ";:GOSUB9
850:IFCH$=""THEN RUN
55 BC=VAL(CH$):IFBC>255THEN20
60 OPEN"D",#1,"MENU/SYS",250:K1=
LOF(1)
```

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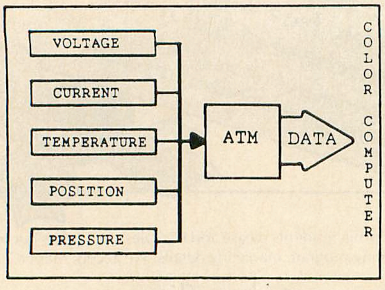

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```
65 FIELD#1,1 AS B0$,1 AS B1$,1 A
S B2$,1 AS B3$,16 AS B4$,200 AS
B5$,1 AS B6$,29 AS B7$
70 FOR A=1 TO K1 STEP 4
75 GET#1,A:IF ASC(B0$)=BC THEN R
0=A:GOTO80 ELSE NEXT A:CLOSE:RUN
80 GOSUB9700:PRINT:PRINT"LOADING
 MENU";BC:BC=ASC(B0$):PR=ASC(B1$
):F$=B2$:GOSUB150:F1$=F$:F$=B3$:
GOSUB150:F2$=F$:BN$=B4$:BT$=B5$
81 K=INSTR(BN$,CHR$(0)):IFK=0THE
N82ELSEBN$=LEFT$(BN$,K-1)
82 K=INSTR(BT$,CHR$(0)):IFK=0THE
N85ELSEBT$=LEFT$(BT$,K-1)
83 IF ASC(B6$)=0 THEN PM$="N" EL
SE PM$="Y"
85 FIELD#1,35 AS B$(0),35 AS B$(
1),35 AS B$(2),35 AS B$(3),35 AS
 B$(4),35 AS B$(5),35 AS B$(6),5
 AS B$(7)
90 B=1:X=0:CO=0
92 X=X+1:GET#1,R0+X
95 FOR A=0 TO 6
96 IF B$(A)=STRING$(35,255)THEN1
20
97 CO=CO+1:BC$(A+B)=B$(A):PRINT"
 RECORD #";CO
100 B$=B$(A):PR$(A+B)=STR$(ASC(L
EFT$(B$,1))):F$=MID$(B$,2,1):GOS
UB150:P1$(A+B)=F$:F$=MID$(B$,3,1
):GOSUB150:P2$(A+B)=F$:TY$(A+B)=
MID$(B$,4,1):D$(A+B)=MID$(B$,5,5
):KY$(A+B)=MID$(B$,10,1):TX$(A+B
)=RIGHT$(B$,25):NEXTA
105 B=B+7:IFB>16THEN120ELSE92
120 PRINT"WAIT..."
135 REM
140 GOTO500
150 '-DECIMAL TO BINARY
152 F=ASC(F$):E=128:F$=""
154 FOR Q=1 TO 8
156 J=INT(F/E)
158 IF J=0 THEN F$=F$+"0"ELSEF$=
F$+"1"
160 F=F-(E*J):E=E/2
162 NEXT Q
166 RETURN
175 '-BINARY TO DECIMAL
177 W=LEN(F$):E=1:F=0
179 FOR Q=W TO 1 STEP -1
181 IFMID$(F$,Q,1)="1"THEN F=F+E
183 E=E*2:NEXTQ:F$=CHR$(F)
185 RETURN
200 CLS:PRINT:PRINT:PRINT
201 F$="MENU/SYS":'PRINT"FOUR CH
ARACTER PREFIX: ";:GOSUB9850:IFL
```

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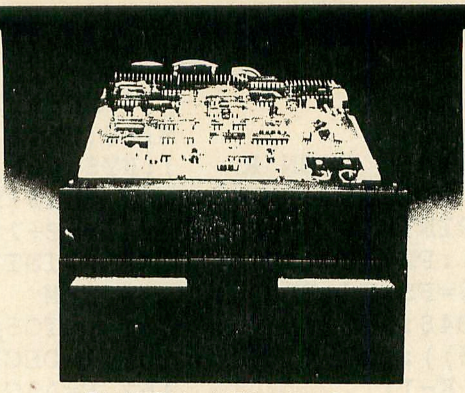

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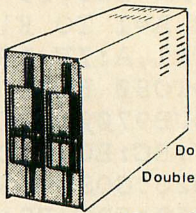

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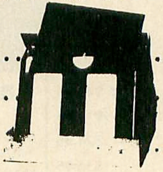

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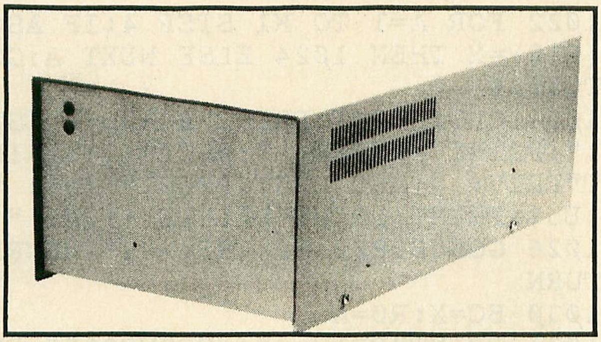

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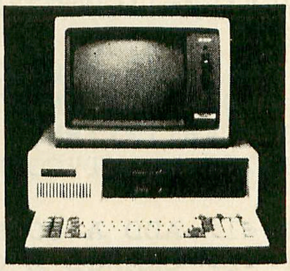

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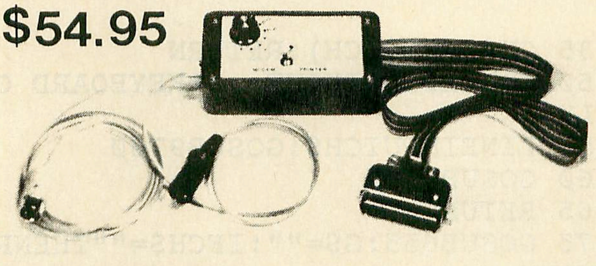

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```
EN(CH$)>4THEN201ELSE F$=CH$+"MEN
U/SYS"
202 PRINT"KILL OLD MENU FILE? ";
205 GOSUB675
210 IFCH$="N"THENPRINT"NO":FORT=
1TO500:NEXTT:GOTO220
215 IFCH$="Y"THENPRINT"YES":KILL
 "MENU/SYS":R0=1:GOTO220
216 GOTO205
220 OPEN"D",#1,F$,250:K1=LOF(1)
500 FORT=1TO5:PRINT:NEXT T:CLS:P
RINT"#";BC;TAB(10);BN$
505 GOSUB9700:PRINT"COMMANDS: ";
CO:PRINT
510 PRINT"<1> ADD A COMMAND"
520 PRINT"<2> CHANGE A COMMAND"
525 PRINT"<3> LIST MENU"
530 PRINT"<4> ADD/CHANGE BOARD M
ENU"
535 PRINT"<5> LIST/EDIT HEADER"
540 PRINT"<6> DELETE A COMMAND
545 PRINT"<7> EXIT AND WRITE
550 PRINT"<8> EXIT":GOSUB9700
555 GOSUB600:A=VAL(CH$):IFA<1ORA
>8THEN555
560 GOSUB9700:ON A GOSUB 1100,12
00,1300,1000,1500,1600,2000,9999
565 GOTO500
600 '-SINGLE KEY ENTRY
602 CH$=INKEY$:IFCH$<>""THEN610
605 EXEC&H10DA:CH$=CHR$(PEEK(448
1)):IFCH$=CHR$(0)THEN602ELSEIFCH
$=CHR$(13)THENCH$=""
610 GOSUB9700
615 RETURN
625 GOSUB602:IFCH$=""THENRETURNE
LSECH=ASC(CH$)
630 IFCH>96ANDCH<123THEN CH=CH-3
2
635 CH$=CHR$(CH):RETURN
650 '-REMOTE INPUT  **KEYBOARD O
NLY
655 LINEINPUTCH$:GOSUB9700
660 GOSUB9700
665 RETURN
675 GOSUB655:G$="":IFCH$=""THENR
ETURN
680 FOR A=1 TO LEN(CH$)
685 G=ASC(MID$(CH$,A,1)):IFG>96A
NDG<123THEN G=G-32
690 G$=G$+CHR$(G):NEXTA:CH$=G$:R
ETURN
1000 '-CREATE A MENU-
1005 '
1010 PRINT:PRINT:PRINT:GOSUB9700
:PRINT"<A>DD OR <C>HANGE: ";:GOS
UB625:IFCH$="A"THEN B8=0:GOTO101
5 ELSE IFCH$="C"THEN B8=1 ELSE R
ETURN
1015 R0=LOF(1)+1:CLS:PRINT:PRINT
:PRINT:PRINT"  BOARD #";:GOSUB98
50:IF CH$="" THEN RETURN ELSE X=
VAL(CH$):IF X<0 OR X>254 THEN 10
15
1020 FIELD#1,1 AS B1$,1 AS B2$,1
 AS B3$,1 AS B4$,16 AS B5$,230 A
S B6$:K1=LOF(1):IF K1=0 THEN 103
0
1022 FOR A=1 TO K1 STEP 4:IF ASC
(B1$)=X THEN 1024 ELSE NEXT A:GO
TO1030
1024 CLS:PRINT:PRINT"BOARD EXIST
:":PRINT"NUMBER: ";ASC(B1$):PRIN
T"PRIV: ";ASC(B2$):PRINT"NAME: "
;B5$:PRINT:PRINT"DELETE (Y/N) "
1026 GOSUB9800:IF CH$<>"Y"THENRE
TURN
1030 BC=X:R0=A
1031 PRINT"PRIV: ";:GOSUB9850:PR
=VAL(CH$):IF PR<0 OR PR>254 THEN
 1031
1032 PRINT"FLAG 1: ";:GOSUB9850:
IFLEN(CH$)<>8THEN1032ELSE F1$=CH
$
1034 PRINT"FLAG 2: ";:GOSUB9850:
IFLEN(CH$)<>8THEN1034ELSEF2$=CH$
1036 PRINT"NAME: ";:GOSUB9850:BN
$=LEFT$(CH$+STRING$(16,0),16)
1037 IF B8=0 THEN CO=0
1038 PRINT"POST MESSAGES? ";:GOS
UB625:IFCH$="Y"THEN PM$="Y":PRIN
T"YES"ELSEPRINT"NO": PM$="N"
1040 PRINT"ENTER TEXT, USE SHIFT
-CLEAR KEY":PRINT"FOR <CR>. END
WITH <CR> ALONE"
1045 TS$=CHR$(13)+CHR$(8)+"\":GO
TO1574
1050 RETURN
1100 '-ADD A COMMAND-
1105 PRINT:PRINT:PRINT"INSERT AF
TER: ";
1106 GOSUB9850:Y=VAL(CH$):IFY=0
AND CH$="L"THEN Y=CO ELSEIFCH$="
"THENRETURN
1110 Y=Y+1:IFY>21THENPRINT"BUFFE
R FULL.":RETURN
1115 CO=CO+1:IF CO>21 THEN PRINT
"COMMAND BUFFER FULL":RETURNELSE
CLS:PRINT:PRINT
1120 PRINT"BOARD COMMAND #";CO
1125 PRINT"TEXT: ";:GOSUB650:TX$
=LEFT$(CH$+STRING$(25,0),25)
1130 PRINT" KEY: ";:GOSUB9800:KY
$=CH$:PRINTCH$
1135 PRINT"PRIV: ";:GOSUB9850:X=
VAL(CH$):IFX<0ORX>254THEN1135ELS
E PR$=CH$
1140 PRINT"  P1: ";:GOSUB9850:IF
```

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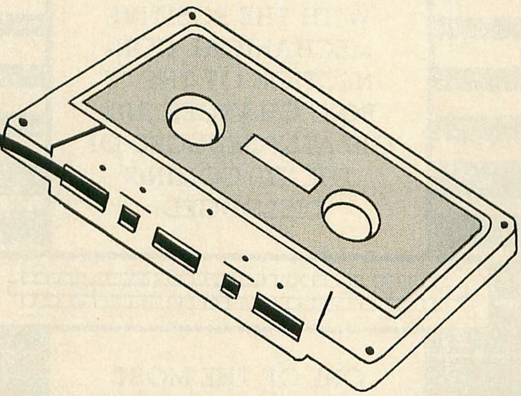

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```
LEN(CH$)<>8THEN1140ELSE P1$=CH$
1145 PRINT"  P2: ";:GOSUB9850:IF
LEN(CH$)<>8THEN1145ELSE P2$=CH$
1150 PRINT:PRINT"TYPE: ";:GOSUB9
800:IFCH$=""THEN1150ELSEX=ASC(CH
$):IFX<33ORX>90THEN1150ELSE TY$=
CH$:PRINTCH$
1155 PRINT"DATA: ";:GOSUB9850:IF
LEN(CH$)>5THEN1155ELSED$=CH$
1160 PRINT:PRINT"DATA ENTERED":F
ORT=1TO500:NEXTT:PRINT"WAIT...":
IF CO=1 OR Y=CO THEN A=CO:GOTO11
80
1165 FOR A=CO-1 TO 1 STEP -1
1170 TX$(A+1)=TX$(A):KY$(A+1)=KY
$(A):PR$(A+1)=PR$(A):P1$(A+1)=PR
$(A):P1$(A+1)=P1$(A):P2$(A+1)=P2
$(A):TY$(A+1)=TY$(A):D$(A+1)=D$(
A)
1175 IF A=Y THEN 1180ELSENEXT A:
A=1:RETURN
1180 TX$(A)=TX$:KY$(A)=KY$:PR$(A
)=PR$:P1$(A)=P1$:P2$(A)=P2$:TY$(
A)=TY$:D$(A)=D$
1185 RETURN
1200 '-CHANGE MENU-
1205 '
1210 '
1215 CLS:PRINT:PRINT
1220 PRINT"MENU NUMBER: ";:GOSUB
9850:IFCH$=""THENRETURN
1225 X=VAL(CH$):IFX>21THEN1220
1230 CLS:PRINT:PRINT:PRINT"MENU
PROMPT #";X:PRINT
1235 PRINT"TEXT: ";TX$(X):PRINT"
   >";:GOSUB9850
1240 IFCH$=""THEN1245ELSETX$(X)=
CH$
1245 PRINT" KEY: ";KY$(X):PRINT"
    >";:GOSUB9800:IFCH$=""THEN12
50ELSEKY$(X)=CH$:PRINTCH$
1250 PRINT"PRIV: ";PR$(X):PRINT"
 >";:GOSUB9850:IFCH$=""THEN1255E
LSEPR$(X)=CH$
1255 PRINT"  P1: ";P1$(X):PRINT"
 >";:GOSUB9850:IFCH$=""THEN1260E
LSEP1$(X)=CH$
1260 PRINT"  P2: ";P2$(X):PRINT"
 >";:GOSUB9850:IFCH$=""THEN1265E
LSEP2$(X)=CH$
1265 PRINT"TYPE: ";TY$(X);:PRINT
" >";:GOSUB9800:IFCH$=""THEN1270
ELSETY$(X)=CH$:PRINTCH$
1270 PRINT:PRINT"DATA: ";D$(X);:
PRINT" >";:GOSUB9850:IFCH$=""THE
N1275ELSED$(X)=CH$
1275 PRINT:PRINT"EDIT COMPLETE"
1280 FORT=1TO500:NEXTT:RETURN
1300 '-LIST MENU-
```

```
1305 '
1310 GOSUB9700
1315 CLS:PRINT:PRINT:PRINT
1320 PRINTTAB(5)"<1> FULL LISTIN
G"
1325 PRINTTAB(5)"<2> TEXT LISTIN
G"
1330 PRINTTAB(5)"<3> PRINT LISTI
NG"
1335 GOSUB600:IFCH$=""THEN1335EL
SEA=VAL(CH$)
1340 IFA>3THEN1335
1345 ON A+1 GOTO 1350,1355,1400
1350 RETURN
1355 FOR X=1 TO CO
1356 GOSUB1360:GOTO1396
1360 CLS:PRINT:PRINT:PRINT"MENU
NUMBER: ";X
1365 PRINT:PRINT"TEXT: ";TX$(X)
1370 PRINT" KEY: ";KY$(X)
1375 PRINT"PRIV: ";PR$(X)
1380 PRINT"  P1: ";P1$(X)
1385 PRINT"  P2: ";P2$(X)
1390 PRINT"TYPE: ";TY$(X)
1395 PRINT"DATA: ";D$(X):RETURN
1396 GOSUB625:IFCH$="Q"THEN RETU
RN ELSE NEXT X
1397 PRINT"END OF FILE":FORT=1TO
500:NEXTT:RETURN
1400 CLS:PRINT
1405 PRINT BT$:PRINT
1410 PRINT:PRINTBN$
1415 FOR X=1 TO CO
1420 PRINT TX$(X):GOSUB9700
1425 FORT=1TO100:NEXTT
1430 NEXTX
1435 GOSUB9800::RETURN
1500 '-HEADER-
1505 '
1510 '
1515 CLS:PRINT:PRINT:PRINT
1520 PRINTTAB(5)"<1> LIST HEADER
"
1525 PRINTTAB(5)"<2> ENTER NEW H
EADER":PRINTTAB(5)"<ENTER> TO EX
IT"
1530 GOSUB600:A=VAL(CH$)
1535 IFA>2THEN1530
1540 ON A+1 GOTO1545,1550,1565
1545 RETURN
1550 CLS:PRINT:PRINT:PRINT
1555 PRINT"HEADER FOR BOARD: ";B
C:PRINT:PRINTBT$
1560 GOSUB9800:GOTO1500
1565 CLS:PRINT:PRINT:PRINT:PRINT
"OLD HEADER READS:"
1570 TS$=CHR$(13)+CHR$(8)+"\":PR
INTBT$:PRINT:PRINT"ENTER NEW HEA
DER...":PRINT:PRINT:BT$=""
1574 PRINT">";
1575 GOSUB600:IFCH$=""THEN1500EL
SEK=INSTR(TS$,CH$):ON K+1 GOTO 1
595,1580,1585,1590
1580 GOTO1500
1585 IFLEN(BT$)>1THEN PRINTCHR$(
8);:BT$=LEFT$(BT$,LEN(BT$)-1):GO
TO1575
1590 PRINT:BT$=BT$+CHR$(13):GOTO
1574
1595 BT$=BT$+CH$:PRINTCH$;:GOTO1
575
1600 '-DELETE A COMMAND
1605 '
1610 '
1615 CLS:PRINT:PRINT:PRINT"COMMA
ND #";:GOSUB9850
1620 X=VAL(CH$):IFX=0THEN RETURN
ELSEIFX>CO THEN1615
1625 PRINT:PRINT"COMMAND #";X:PR
INTTX$(X)
1630 PRINT"DELETE (Y/N)? ";
1635 GOSUB9800:IFCH$<>"Y"THENRET
URN
1640 PRINT"  DELETING...";
1645 FORA=X TO CO-1
1650 TX$(A)=TX$(A+1):KY$(A)=KY$(
A+1):PR$(A)=PR$(A+1):P1$(A)=P1$(
```

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```
A+1):P2$(A)=P2$(A+1):TY$(A)=TY$(
A+1):D$(A)=D$(A+1)
1655 NEXTA:PRINT:CO=CO-1:RETURN
2000 '-SAVE MENU
2005 '
2010 '
2015 CLS:PRINT:PRINT
2020 PRINT"SAVING HEADER....."
2025 FIELD#1,1 AS B1$,1 AS B2$,1
 AS B3$,1 AS B4$,16 AS B5$,200 A
S B6$,1 AS B7$,29 AS B8$
2030 IFLOF(1)=0 THEN R0=1
2035 LSET B1$=CHR$(BC):LSET B2$=
CHR$(PR):F$=F1$:GOSUB175:LSET B3
$=F$:F$=F2$:GOSUB175:LSET B4$=F$
2040 LSET B5$=BN$+CHR$(0):LSET B
6$=BT$+CHR$(0):IF PM$="Y"THEN LS
ET B7$=CHR$(255)ELSE LSET B7$=CH
R$(0)
2045 PUT#1,R0
2050 PRINT"SAVING MENU COMMANDS.
.."
2055 FIELD#1,35 AS B$(0),35 AS B
$(1),35 AS B$(2),35 AS B$(3),35
AS B$(4),35 AS B$(5),35 AS B$(6)
,5 AS B$(7):X=0
2057 FOR B=1 TO 16 STEP 7
2060 FOR A=0 TO 6
2065 IF A+B>CO THEN C$=STRING$(3
5,255)ELSEGOSUB2095:PRINT"  SAVI
NG RECORD";A+B
2070 LSET B$(A)=C$:NEXTA:LSET B$
(7)=MKN$(BC)
2075 R0=R0+1:PUT#1,R0
2080 NEXTB:RUN
2095 X=VAL(PR$(A+B)):C$=CHR$(X)
2100 F$=P1$(A+B):GOSUB175:C$=C$+
F$:F$=P2$(A+B):GOSUB175:C$=C$+F$
2105 C$=C$+TY$(A+B):D$=LEFT$(D$(
A+B)+"     ",5)
2110 C$=C$+D$+KY$(A+B)+TX$(A+B)+
STRING$(25,0)
2115 RETURN
9700 '-CD CHECK-
9705 IFPEEK(4658)=0THEN9740
9710 CD=PEEK(65385)AND32
9715 IFCD<>0ORPEEK(4657)<>0THEN9
750
9740 RETURN
9750 CLOSE:UNLOAD:RUN
9800 '
9805 GOTO625
9806 IFCH$=CHR$(13)THENCH$=""
9810 RETURN
9815 '-FLAG INPUT-
9820 F$=""
9825 FOR X=1 TO 8
9830 GOSUB600:VL=ASC(CH$):IFVL<4
8ORVL>49THEN600 ELSE F$=F$+CH$:P
RINTCH$;:NEXTX
9835 PRINT:RETURN
9850 '-LINE ENTRY-
9855 GOTO675
9860 RETURN
```

610	179	3270	184
925	150	3565	247
1125	105	4020	160
1370	230	6040	113
2005	52	6200	102
2085	229	7010	55
3125	198	8045	133
		END	176

Listing 3: SUL EDI

```
0 '-COBBS (SUL/EDI) <C>1985
    BY RICHARD DUNCAN
10 CLEAR2500
20 DR$(0)="0":DR$(1)="1":DR$(2)=
"2":DR$(3)="3":R0=2
30 CLS:PRINT:PRINT"COBBS USERLOG
 EDITOR":PRINT:PRINT
40 GOSUB9200
45 GOSUB900
50 PRINT:PRINT"COMMAND> ";
60 GOSUB625:K=INSTR("SGNLMRADPBQ
UE?H",CH$):IFK=0THEN60ELSE PRINT
CH$
70 ON K GOSUB 1000,1100,80,90,12
00,1300,1400,1500,1640,2000,7000
,1700,6000,75,1600
71 GOTO50
75 CLS:PRINT:PRINT"      COBBS USE
RLOG EDITOR":PRINT:PRINT:GOSUB90
0:RETURN
80 R0=R0+1:IF R0>LOF(1) THEN R0=
1
85 GET#1,R0:GOSUB8000:RETURN
90 R0=R0-1:IF R0<1 THEN R0=LOF(1
)
95 GET#1,R0:GOSUB8000:RETURN
600 '-SINGLE KEY ENTRY
602 CH$=INKEY$:IFCH$<>""THEN610
605 EXEC4314:CH$=CHR$(PEEK(4481)
)
610 GOSUB9700:IFCH$=CHR$(0)THEN6
02
615 RETURN
625 GOSUB602:CH=ASC(CH$)
630 IFCH>96ANDCH<123THEN CH=CH-3
2
635 CH$=CHR$(CH):RETURN
650 '-REMOTE INPUT  **KEYBOARD O
NLY
655 LINEINPUTCH$:GOSUB9700
665 RETURN
675 GOSUB655:G$="":IFCH$=""THENR
```

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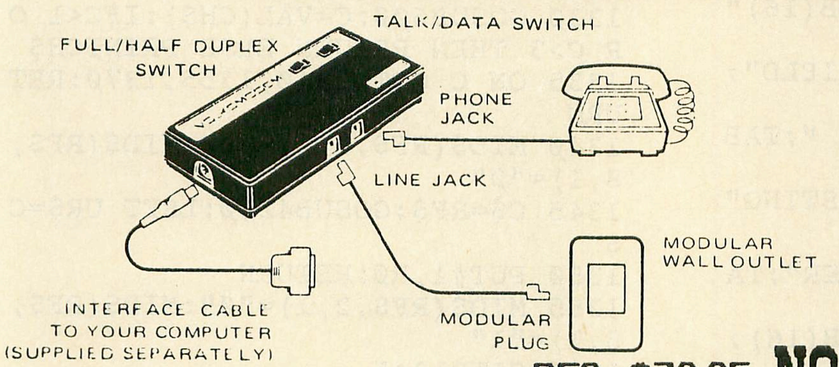

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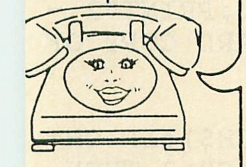

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```
ETURN
680 FOR A=1 TO LEN(CH$)
685 G=ASC(MID$(CH$,A,1)):IFG>96A
NDG<123THEN G=G-32
690 G$=G$+CHR$(G):NEXTA:CH$=G$:R
ETURN
900 PRINTTAB(10)"USERS:";LOF(1)-
1:PRINTTAB(0)"<S>EARCH";TAB(16)"
<G>O TO USER #"
905 PRINTTAB(0)"<N>EXT";TAB(16)"
<L>AST ENTRY"
910 PRINTTAB(0)"<M>ODIFY FIELD";
TAB(16)"<R>EGISTER"
915 PRINTTAB(0)"<A>CTIVATE ";TAB
(16)"<D>ELETE
920 PRINTTAB(0)"<P>RINT LISTING"
;TAB(16)"<B>ACKUP"
925 PRINTTAB(0)"<E>NTER USER";TA
B(16)"<U>SER CLASS"
930 PRINTTAB(0)"<Q>UIT";TAB(16);
"<H>ARD COPY"
990 RETURN
1000 '-SEARCH-
1005 '
1010 '
1015 PRINT:PRINT
1020 PRINTTAB(3)"STRING: ";
1025 GOSUB650:IFCH$=""THENRETURN
1026 K=INSTR(CH$,"\"):IFK=0THEN1
030ELSEMID$(CH$,K,1)=CHR$(0):GOT
O1026
1030 K1=LOF(1)
1035 FOR Y=R0 TO K1
1040 GET#1,Y:K=INSTR(UN$,CH$)
1045 IF K=0 THEN NEXT Y:PRINT:PR
INT"USER NOT FOUND":RETURN
1050 R0=Y:GOSUB8000
1055 RETURN
1100 '-GOTO RECORD-
1105 '
1110 '
1115 PRINT:PRINT"RECORD NUMBER:
";
1120 GOSUB650:IF VAL(CH$)>LOF(1)
OR VAL(CH$)<1THENRETURN
1125 R0=VAL(CH$):IF R0>LOF(1)THE
NPRINT"RECORD INVALID.":RETURN E
LSE GET#1,R0:GOSUB8000
1130 RETURN
1200 '-MODIFY USER RECORD-
1205 '
1210 PRINT"MODIFY RECORD: ";
1215 GOSUB625
1220 K=INSTR("ABCDEFGHIJKLMNOP",
CH$):IFK=0THENRETURN
1225 PRINTCH$:ON K GOTO 3000,310
0,3050,3120,3150,3200,3250,3300,
3350,3400,3450,3500,3550,3600,36
50,3700,3750
1300 '-REGISTER-
1305 PRINT:PRINT:PRINTNA$:PRINT
1310 PRINT"   1 - NEW USER":PRIN
T"   2 - PROBATION USER":PRINT"
  3 - REGISTERED USER"
1325 PRINT"COMMAND: ";
1330 GOSUB600:C=VAL(CH$):IFC<1 O
R C>3 THEN RETURN ELSE PRINTCH$
1335 ON C GOTO1340,1355,1370:RET
URN
1340 MID$(RF$,2,1)="0":MID$(RF$,
8,1)="0"
1345 C$=RF$:GOSUB4200:LSET UR$=C
$
1350 PUT#1,R0:RETURN
1355 MID$(RF$,2,1)="0":MID$(RF$,
8,1)="1"
1360 GOTO1345
1370 MID$(RF$,2,1)="1":MID$(RF$,
8,1)="1"
1375 GOTO1345
1400 '-ACTIVATE-
1405 MID$(RF$,1,1)="0"
1415 GOTO1345
1500 '-DELETE-
1505 MID$(RF$,1,1)="1"
1510 GOTO1345
1600 '-PRINT
1605 '
1610 CLS:PRINT:PRINT
1615 PRINT"1 - SCREEN":PRINT"2 -
 PRINTER":PRINT"3 - HARD COPY OF
 USERLOG"
1620 PRINT"     >";
1625 GOSUB600:CH=VAL(CH$):IF CH=
0 THEN RETURN ELSE IF CH>3 THEN
1625
1630 PRINTCH$:ON CH GOTO 1640,16
50,1660
1640 SC=0:GOSUB8000:RETURN
1650 SC=-2:GOSUB8000:RETURN
1660 SC=-2
1665 FOR U=2 TO LOF(1)
1670 GET#1,U:GOSUB8000
1675 NEXT U:RETURN
1700 RETURN
2000 '-BACKUP-
2005 PRINT:PRINT:PRINT"USERLOG B
ACKUP"
2010 PRINT:PRINT"DRIVE FOR USERL
/BAK: ";:GOSUB650
2015 IFCH$=""THENRETURNELSE D=VA
L(CH$)
```

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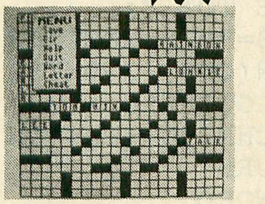

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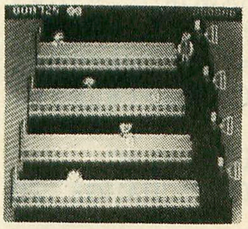

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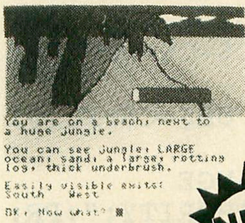

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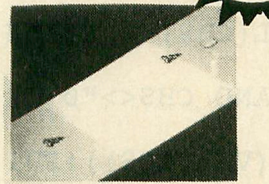

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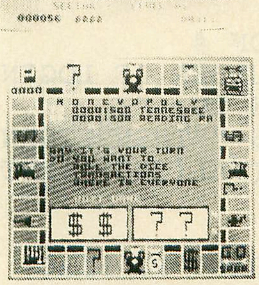

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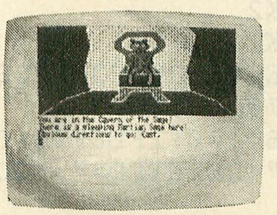

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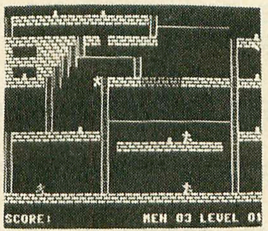

Travel the maze, in your never ending search for **GOLD.** But be careful! There are hidden trap doors, burly guards, tricky ladders & slippery ropes. Sounds easy you say? Clear the 1st screen and 32 more await you!

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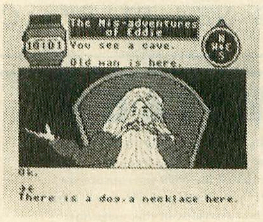

You see a cave.
Old man is here.

Ok.
There is a dog, a necklace here.

Another great graphic adventure!! This time you are exploring an old mine shaft when you stumble upon an old man — and into a different time! His rebellious son Eddie is roaming around time creating havoc and you must bring him home in order to return to your own time. Visit the apple orchard of Isaac Newton, the doomed Titanic — over 140 different locations and 50-plus commands! All in hi-res graphics. Only for the very adventurous and those who "enjoy being frustrated"!

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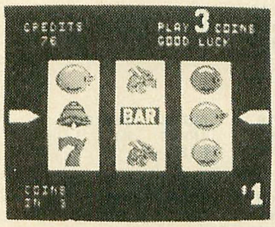

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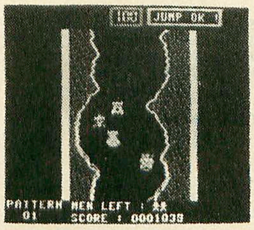

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```
2020 IF D<0 OR D>3 THEN 2010ELSE
PRINT CH$
2025 PRINT"BACKING UP USERLOG":C
LOSE
2030 GOSUB9200
2031 GOSUB9300:IF K2>0THEN CLOSE
:KILL FB$:GOTO2031
2035 GOSUB9225:GET#1,1:LSET U$=P
U$
2040 K2=1:PUT#2,K2
2045 FOR R=2 TO K1
2050 GOSUB9215:GET#1,R:PRINT"USE
R #";R-1;:GOSUB9700
2055 C$=UR$:GOSUB4100:IFLEFT$(C$
,1)="1"THENPRINT"<DELETED>";:GOT
O2065
2060 FIELD#1,96 AS PU$:LSET U$=P
U$:K2=K2+1:PUT#2,K2
2065 PRINT:NEXT R
2070 CLOSE:PRINT:PRINT"VERIFYING
...";
2075 GOSUB9300:FOR R=1 TO K2:GET
#2,R:NEXT R:CLOSE
2080 PRINT"KILL AND COPY? ";:GOS
UB600:IFCH$<>"Y"THENPRINT:GOTO20
90 ELSE PRINT"YES":PRINT:PRINT"K
ILLING OLD FILE";:KILL FS$:PRINT
2085 PRINT"COPYING NEW FILE";:CO
PY FB$ TO FS$:PRINT
2090 CLOSE:GOSUB9200
2095 RETURN
3000 '-CHANGE NAME-
3005 GOSUB4000:PRINT:PRINT"NAME:
 ";NA$:PRINT"CHANGE TO: ";
3010 GOSUB675:IFCH$=""THENRETURN
3015 IF LEN(CH$)+LEN(LO$)>50 THE
NPRINT"NAME TOO LONG!":GOTO3005
3020 LSET UN$=CH$+CHR$(0)+LO$+CH
R$(0):PUT#1,R0
3025 RETURN
3050 '-CHANGE LOCATION-
3055 GOSUB4000:PRINT:PRINT"FROM:
 ";LO$:PRINT"CHANGE TO: ";
3060 GOSUB675:IFCH$=""THENRETURN
3065 IFLEN(NA$)+LEN(CH$)+1>50THE
NPRINT"TOO LONG!":GOTO3055
3070 LSET UN$=NA$+CHR$(0)+CH$+CH
R$(0):PUT#1,R0:RETURN
3100 '-CHANGE PASSWORD
3105 PRINT:PRINT"PASSWORD: ";UP$
:PRINT"CHANGE TO: ";
3110 GOSUB650:IFCH$=""THENRETURN
3115 LSET UP$=CH$+STRING$(8,0):P
UT#1,R0:RETURN
3120 '-CHANGE REGISTER FLAG
3125 C$="":PRINT:PRINT"CHANGE TO
: ";
3130 FOR X=1 TO 8:GOSUB 600:IFCH
$=""THENRETURNELSE C$=C$+CH$:PRI
NTCH$;:NEXTX
3135 GOSUB4200:LSET UR$=C$:PUT#1
,R0:RETURN
3150 '-AUTHORITY CHANGE
3155 PRINT:PRINT"AUTHORITY:";PR:
PRINT"CHANGE TO: ";
3160 GOSUB650:IFVAL(CH$)<256THEN
3165ELSERETURN
3165 IFVAL(CH$)=0 AND CH$<>"0"TH
ENRETURN
3170 LSET UA$=CHR$(VAL(CH$)):PUT
#1,R0:RETURN
3200 '-CHANGE LOG ON #
3205 PRINT:PRINT"NUMBER OF LOGIN
S:";LG:PRINT"CHANGE TO: ";
3210 GOSUB650:IFCH$=""THENRETURN
3215 LSET U5$=MKN$(VAL(CH$)):PUT
#1,R0:RETURN
3250 '-P1 FLAG
3255 C$="":PRINT:PRINT"P1 FLAG:
";F1$:PRINT"CHANGE TO: ";
3260 FOR X=1 TO 8:GOSUB600:IFCH$
=""THENRETURNELSEC$=C$+CH$:PRINT
CH$;:NEXTX:PRINT
3265 F1$=C$:GOSUB4200:LSET U1$=C
HR$(C):PUT#1,R0
3270 RETURN
3300 '-P2 FLAG
```

BASIC COMPILER

WASATCHWARE believes that users of the Color Computer deserve the right to use all 64k of RAM that is available in the computer, and have fast machine language programs that use the full potential of the 6809 microprocessor. That is why the BASIC compiler, called MLBASIC was developed. Here are some of the reasons that make this compiler one of the best bargains in this magazine:

- Programs can use all 64k of RAM for either program storage or for large numbers of variables and arrays like A(20000)
- Full Floating Point arithmetic expressions with functions
- SUBROUTINE and CALL commands allows for structured programming and more independent program development
- Full sequential and direct access disk files allowed
- BASIC source and M.L. output I/O to disk, tape or memory

COMMANDS SUPPORTED

```
1. I/O -Commands
    CLOSE    CLOADM   CSAVEM   DIR      DRIVE    DSKI$
    DSKO$    FIELD    FILES    GET      INPUT    KILL
    LSET     OPEN     PRINT    PUT      RSET

2. Program Control Commands
    CALL     END      EXEC     FOR      STEP     NEXT
    GOSUB    GOTO     IF       THEN     ELSE     ERROR
    ON..GO   RETURN   STOP     SUBROUTINE

3. Math Functions
    ABS      ASC      ATN      COS      CVN      EOF
    EXP      FIX      INSTR    INT      LEN      LOG
    LOC      LOF      PEEK     POINT    PPOINT   RND
    SGN      SIN      SQR      TAN      TIMER    VAL

4. String Functions
    CHR$     INKEY$   LEFT$    MID$     MKN$     RIGHT$
    STR$     STRING$

5. Graphic/Sound Commands
    COLOR    CLS      CIRCLE   DRAW     LINE     PAINT
    PCLEAR   PCLS     PLAY     PMODE    PRESET   PSET
    RESET    SCREEN   SET      SOUND

6. Other/Special Commands
    DATA     DIM      LLIST    MOTOR    POKE     READ
    REM      RESTORE  RUN      TAB      VERIFY   DLD
    DST      IBSHFT   LREG     PCOPY    PMODD    PTV
    REAL     SREG     SWP      VECTD    VECTI
```

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```
3305 C$="":PRINT:PRINT"P2 FLAG:
";F2$:PRINT"CHANGE TO: ";
3310 FOR X=1 TO 8:GOSUB600:IFCH$
=""THENRETURNELSEC$=C$+CH$:PRINT
CH$;:NEXTX:PRINT
3315 F2$=C$:GOSUB4200:LSET U2$=C
HR$(C):PUT#1,R0:RETURN
3350 '-BOARD ENTRY-
3355 PRINT:PRINT"BOARD ENTRY:";B
C:PRINT"CHANGE TO: ";
3365 GOSUB650:IFVAL(CH$)<256THEN
 LSET UE$=CHR$(VAL(CH$)):PUT#1,R
0:RETURN
3400 PRINT:PRINT"CHANGE TO: ";
3405 GOSUB650:IFCH$=""THENRETURN
3410 IFLEN(CH$)>4THEN3400
3415 LSET US$=CH$:PUT#1,R0:RETUR
N
3450 '-
3455 RETURN
3500 '-
3505 RETURN
3550 '-TIME OUT-
3555 PRINT:PRINT"PRESENTLY TIME
OUT:";TM:PRINT"CHANGE TO: ";
3560 GOSUB650:IFCH$=""THENRETURN
3565 C=VAL(CH$):IFC<256THEN LSET
 UO$=CHR$(C):PUT#1,R0
3570 RETURN
3600 '-
3605 RETURN
3650 '-
3655 RETURN
3700 '-
3705 RETURN
3750 '-DATE TIME
3755 PRINT:PRINT"MONTH: ";
3760 GOSUB650:IFCH$=""THENRETURN
ELSE M=VAL(CH$)
3765 PRINT"DAY: ";
3770 GOSUB650:IFCH$=""THENRETURN
ELSE D=VAL(CH$)
3775 PRINT"YEAR: ";
3780 GOSUB650:IFCH$=""THENRETURN
ESLE Y=VAL(CH$)
3785 PRINT"HOUR: ";
3788 GOSUB650:IFCH$=""THENRETURN
ELSE H=VAL(CH$)
3790 PRINT"MINUTE: ";
3795 GOSUB650:IFCH$=""THENRETURN
ELSE MI=VAL(CH$)
3796 LSET UD$=CHR$(M)+CHR$(D)+CH
R$(Y)+CHR$(H)+CHR$(MI):PUT#1,R0
3797 RETURN
4000 '-FIGURE NAME/LOCATION
4005 A1=INSTR(UN$,CHR$(0))
4010 NA$=LEFT$(UN$,A1-1)
4015 A2=INSTR(A1+1,UN$,CHR$(0))
4020 LO$=MID$(UN$,A1+1,A2-A1-1)
4025 RETURN
4100 '-DECIMAL TO BINARY
4105 F=ASC(C$):E=128:C$=""
4110 FOR Q=1 TO 8
4115 J=INT(F/E)
4120 IF J=0 THEN C$=C$+"0"ELSEC$
=C$+"1"
4125 F=F-(E*J):E=E/2
4130 NEXT Q
4135 'PRINTF$
4140 RETURN
4200 '-BINARY TO DECIMAL
4205 W=LEN(C$):E=1:F=0
4210 FOR Q=W TO 1 STEP -1
4215 IFMID$(C$,Q,1)="1"THEN F=F+
E
4220 E=E*2:NEXTQ:C=F:C$=CHR$(C)
4225 RETURN
6000 '-ENTER USER IN LOG
6005 CLS
6010 PRINT:PRINT
6015 PRINT"NAME: ";:GOSUB650
6020 IFCH$=""THENRETURN
6025 NA$=CH$
6030 PRINT"FROM: ";:GOSUB650
6035 IFCH$=""THENRETURN
6040 LO$=CH$:IF LEN(NA$)+LEN(LO$
)+2>50THENPRINT"NAME/LOCATION TO
```

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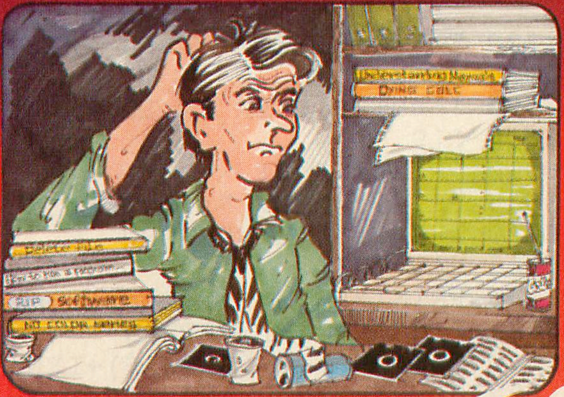

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```
O LONG!":GOTO6000
6045 PRINT"PASS: ";:GOSUB650
6050 PW$=CH$
6055 PRINT"AUTHORITY: ";:GOSUB65
0
6060 IFCH$=""THENRETURNELSEIFVAL
(CH$)>255THEN6055
6065 AU=VAL(CH$)
6070 PRINT"P1 FLAG: ";:GOSUB650
6075 IFCH$=""THENRETURNELSEIFLEN
(CH$)<>8THEN6070
6080 P1$=CH$
6085 PRINT"P2 FLAG: ";:GOSUB650
6090 IFCH$=""THENRETURNELSEIFLEN
(CH$)<>8THEN6085
6095 P2$=CH$
6100 PRINT"REGISTER FLAGS: ";:GO
SUB650
6105 IFCH$=""THENRETURNELSEIFLEN
(CH$)<>8THEN6100
6110 R$=CH$
6115 PRINT"BOARD ENTRY MENU: ";:
GOSUB650
6120 BE$=CH$
6125 PRINT"TIME OUT: ";:GOSUB650
6130 IFCH$=""THENRETURNELSE IFVA
L(CH$)>255THEN6125
6135 TI$=CH$
6140 PRINT"SYSTEM MENU: ";:GOSUB
650
6145 IFLEN(CH$)>4THEN6140ELSE SM
$=CH$
6200 PRINT"OK TO SAVE (Y/N)? ";
6205 GOSUB650:IFCH$="Y"THEN6210E
LSEIFCH$="N"THEN6000ELSE6205
6210 K1=LOF(1):LSET UM$=MKN$(0):
LSET U7$=CHR$(0):LSET U8$=CHR$(0
):LSET UL$=CHR$(0)
6215 LSET UN$=NA$+CHR$(0)+LO$+CH
R$(0):LSET UP$=PW$+STRING$(8,0)
6220 C$=R$:GOSUB4200:LSET UR$=CH
R$(C):LSET UA$=CHR$(AU)
6225 C$=P1$:GOSUB4200:LSET U1$=C
HR$(C):C$=P2$:GOSUB4200:LSET U2$
=CHR$(C)
6230 LSET UE$=CHR$(VAL(BE$)):LSE
T U5$=CHR$(0):LSET UU$=""
6235 LSET UM$=CHR$(0):LSET UD$=S
TRING$(5,0):LSET U3$="":LSET U4$
=""
6240 LSET UO$=CHR$(VAL(TI$)):LSE
T US$=SM$
6245 LSET SP$=""
6275 K1=LOF(1)
6280 K1=K1+1:PUT#1,K1
6285 IFK1<2THEN6280
6290 R0=K1:RETURN
7000 '-QUIT-
7005 CLOSE:CLS:PRINT:PRINT:PRINT
7010 PRINTTAB(5)"1-RESTART
7015 PRINTTAB(5)"2-RETURN TO BBS
"
7020 PRINTTAB(5)"3-EXIT TO DOS"
7025 '
7030 GOSUB600
7035 IF VAL(CH$)>3THEN7030
7040 ON VAL(CH$)+1 GOTO7005,7045
,7050,7055
7045 RUN
7050 LOAD"COBBS/SYS",R
7055 PRINT"     ACCESS: ";:GOSUB
675:IFCH$="REBOOT CLEARED" THEN
POKE&HAC7D,&HA3:POKE&HAC7E,&H90:
END ELSE RUN
8000 '-PRINT LISTING-
8005 '
8010 IFSC=0THENPRINT"USER #";R0-
1:TB=0 ELSE PRINT#SC,"USER #";U-
1:TB=10
8020 GOSUB4000:PRINT#SC,TAB(0)"A
) ";NA$:PRINT"B) ";UP$
8025 PRINT#SC,TAB(TB)"C) ";LO$
8030 C$=UR$:GOSUB4100:PRINT#SC,"
D) ";C$:RF$=C$
8035 PRINT#SC,TAB(TB)"E) ";ASC(U
A$);TAB(TB+16)"F) ";CVN(U5$):PR=
ASC(UA$):LG=CVN(U5$)
```

Submitting Material To Rainbow

Contributions to THE RAINBOW are welcome from everyone. We like to run a variety of programs which will be useful/helpful/fun for other CoCo owners.

Program submissions must be on tape or disk and it is best to make several saves, at least one of them in ASCII format. We're sorry, but we do not have time to key in programs. All programs should be supported by some editorial commentary explaining how the program works. Generally, we're much more interested in how your submission works and runs than how you developed it. Programs should be learning experiences.

We do pay for submissions, based on a number of criteria. Those wishing remuneration should *so state* when making submissions.

For the benefit of those who wish more detailed information on making submissions, please send an SASE to: Submissions Editor, THE RAINBOW, The Falsoft Building, Prospect, KY 40059. We will send you some more comprehensive guidelines.

Please do not submit programs or articles currently submitted to another publication.

```
8040 PRINT#SC,TAB(TB)"G) ";:C$=U
1$:GOSUB4100:PRINT#SC,C$;:F1$=C$
:PRINT#SC,TAB(TB+16)"H) ";:C$=U2
$:GOSUB4100:PRINT#SC,C$:F2$=C$
8045 PRINT#SC,TAB(TB)"I) ";ASC(U
E$);TAB(TB+16)"J) ";US$:BC=ASC(U
E$)
8050 PRINT#SC,TAB(TB)"K) ";TAB(T
B+16)"L)";ASC(UL$)
8055 PRINT#SC,TAB(TB)"M) ";ASC(U
O$);TAB(TB+16)"N) ":TM=ASC(UO$)
8060 PRINT#SC,TAB(TB)"O) ";CVN(U
M$);TAB(TB+16)"P) ";ASC(U7$)*256
+ASC(U8$)
8065 PRINT#SC,"Q) LAST FLAG: ";A
SC(LEFT$(UD$,1));"/";ASC(MID$(UD
$,2,1));"/";ASC(MID$(UD$,3,1));"
 ";ASC(MID$(UD$,4,1));":";ASC(M
ID$(UD$,5,1)):PRINT#SC,""
8070 RETURN
9200 '-OPEN USERLOG-
9205 FS$="USERL/SYS"
9210 OPEN"D",#1,FS$,96
9215 FIELD#1,50 AS UN$,8 AS UP$,
1 AS UR$,1 AS UA$,1 AS U1$,1 AS
U2$, 1 AS UU$,1 AS UE$,5 AS U5$,
5 AS UM$,5 AS UD$,1 AS U3$,1 AS
U4$,1 AS UO$,1 AS UL$,4 AS US$,1
 AS U7$,1 AS U8$,7 AS SP$
9220 K1=LOF(1):RETURN
9225 FIELD#1,96 AS PU$:GOTO9220
9300 '-OPEN USERL/BAK-
9305 FB$="USERL/BAK:"+DR$(D)
9310 OPEN"D",#2,FB$,96
9315 FIELD#2,96 AS U$
9320 '
9325 K2=LOF(2):RETURN
9700 '-CD CHECK-
9705 IFPEEK(4658)=0THEN9740
9710 CD=PEEK(65385)AND32
9715 IFCD<>0ORPEEK(4657)<>0THEN9
750
9740 RETURN
9750 LOAD"USER/SYS",R
9800 '
9805 GOTO625
9815 '-FLAG INPUT-
9820 F$=""
9825 FOR X=1 TO 8
9830 GOSUB600:F$=F$+CH$:PRINTCH$
;:NEXTX
9835 PRINT:RETURN
9850 '-LINE ENTRY-
9855 LINEINPUTCH$
9860 RETURN
```

1050 6
1235 23
1345 41
9120 203
END 57

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Listing 4: `SMP EDI`

```
0 '-COBBS (SMP/EDI) <C>1985
    BY RICHARD DUNCAN
5 CLEAR5000
10 REM
100 GOTO1000
600 LINEINPUTCH$
605 RETURN
650 '-LINE INPUT-
655 LINEINPUTCH$
660 RETURN
1000 '-PURGE MESSAGE BAS-
1005 '
1010 '
1015 PRINT"READY TO PURGE?";:GOS
UB650
1020 IFLEFT$(CH$,1)="Y"THEN1025E
LSEEND
1025 PRINT:PRINT:PRINT:PRINT"HDR
/SYS DRIVE: ";:GOSUB600:HS=VAL(C
H$):PRINTHS
1030 PRINT"HDR/BAK DRIVE: ";:GOS
UB600:HB=VAL(CH$):PRINTHB
1035 PRINT"MSG/SYS DRIVE: ";:GOS
UB600:MS=VAL(CH$):PRINTMS
1040 PRINT"MSG/BAK DRIVE: ";:GOS
```

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John Hancock

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```
UB600:MB=VAL(CH$):PRINTMB
1042 PRINT"MINIMUM MESSAGE: ";:G
OSUB650:MG=VAL(CH$)
1045 PRINT:PRINT"  CORRECT? ";:G
OSUB650
1050 IFLEFT$(CH$,1)="Y"THEN1060E
LSE1000
1060 CLS:PRINT:PRINT:PRINT"PURGI
NG HEADERS"
1065 GOSUB9000:GOSUB9100
1100 '-PURGE HEADER-
1105 GET#1,1:LSET I1$=H1$:LSET I
2$=H2$:LSET I3$=H3$:PUT#2,1:K2=1
1110 FOR R=2 TO K1
1115 GET#1,R:N=CVN(H1$):PRINT"RE
CORD #";N;
1120 GOSUB8000
1125 IFMID$(FL$,2,1)="1" OR N<MG
 THENPRINT"<DELETED>":GOTO1140
1130 K2=K2+1:LSET I1$=H1$:LSET I
2$=H2$:LSET I3$=H3$
1135 PUT#2,K2:PRINT
1140 NEXT R
1145 CLOSE:PRINT:PRINT"MESSAGE H
EADERS PURGED."
1200 '-PURGE MESSAGE BASE-
1205 PRINT:PRINT"PURGING MESSAGE
 BASE"
1210 GOSUB 9150:RX=LOF(2):CLOSE
1215 FOR R=2 TO RX
1220 GOSUB9150:GET#2,R
1225 RS=CVN(H6$):RE=CVN(H7$):PRI
NT"MESSAGE #";CVN(H1$);
1230 CLOSE:GOSUB9200:GOSUB9300:R
1=K2+1
1235 FOR A=RS TO RE
1240 GET#1,A:LSET MX$=MG$
1245 K2=K2+1:PUT#2,K2
1250 NEXT A:R2=K2:CLOSE
1255 GOSUB9150:GET#2,R:LSET H6$=
MKN$(R1):LSET H7$=MKN$(R2)
1260 PUT#2,R:CLOSE:PRINT:NEXT R
1270 PRINT:PRINT"VERIFYING FILES
":PRINT"   HDR/BAK";:GOSUB9100
1275 FOR A=1 TO LOF(2):GET#2,A:N
EXTA:CLOSE:PRINT
1280 PRINT"   MSG/BAK";:GOSUB930
0
1285 FOR A=1 TO K2:GET#2,A:NEXT:
CLOSE:PRINT:PRINT
1300 '-KILL OLD FILES-
1305 '
1310 '
1315 PRINT:PRINT:PRINT"KILL AND
COPY FILES? ";
1320 GOSUB600:IF CH$<>"Y"THEN EN
D
1325 PRINT"YES":PRINT:PRINT
1330 PRINT"KILLING OLD HEADER";
1335 FH$="HDR/SYS:"+RIGHT$(STR$(
HS),1):KILL FH$:PRINT
1340 PRINT"KILLING OLD TEXT";
1345 FM$="MSG/SYS:"+RIGHT$(STR$(
MS),1):KILL FM$:PRINT
1350 PRINT"COPYING NEW HEADER";
1355 HB$="HDR/BAK:"+RIGHT$(STR$(
HB),1):COPY HB$ TO FH$:PRINT
1360 PRINT"COPYING NEW BASE";
1365 MB$="MSG/BAK:"+RIGHT$(STR$(
MB),1):COPY MB$ TO FM$:PRINT
1370 PRINT:PRINT
1390 END
8000 '-DECIMAL TO BINARY-
8005 '
8010 F=ASC(H2$):E=128:FL$=""
8015 FOR Q=1 TO 8
8020 J=INT(F/E)
8025 IF J=0 THEN FL$=FL$+"0"ELSE
 FL$=FL$+"1"
8030 F=F-(E*J):E=E/2
8035 NEXT Q:RETURN
9000 '-OPEN HDR/SYS-
9005 '
9010 F$="HDR/SYS:"+RIGHT$(STR$(H
S),1)
9015 OPEN"D",#1,F$,110
9020 FIELD#1,5 AS H1$,1 AS H2$,1
04 AS H3$
9025 K1=LOF(1):RETURN
9100 '-OPEN HDR/BAK-
9105 '
9110 F$="HDR/BAK:"+RIGHT$(STR$(H
B),1)
9115 OPEN"D",#2,F$,110
9120 FIELD#2,5 AS I1$,1 AS I2$,1
04 AS I3$
9125 K2=LOF(2):RETURN
9150 'HEADER/BAK FIELD
9155 GOSUB9100
9160 FIELD#2,5 AS H1$,1 AS H2$,3
 AS H3$,2 AS H4$,80 AS H5$,5 AS
H6$,5 AS H7$,1 AS H8$,8 AS SP$
9165 RETURN
9200 '-MSG/SYS-
9205 '
9210 F$="MSG/SYS:"+RIGHT$(STR$(M
S),1)
9215 OPEN"D",#1,F$,80
9220 FIELD#1,80 AS MG$
9225 K1=LOF(1):RETURN
9300 '-MSG/BAK-
9305 '
9310 F$="MSG/BAK:"+RIGHT$(STR$(M
B),1)
9315 OPEN"D",#2,F$,80
9320 FIELD#2,80 AS MX$
9325 K2=LOF(2):RETURN
```

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Palo Alto
Feb. 14-16
RAINBOWfest®

Show Schedule:

Friday evening
- Exhibits open from 7 p.m. to 10 p.m.

Saturday
- CoCo Community Breakfast at 8 a.m.
- Exhibits open at 10 a.m. and close at 6 p.m.

Sunday
- OS-9 Users Group Breakfast at 9 a.m.
- Exhibits open from 11 a.m. to 4 p.m.

RAINBOWfest/PCMfest
Palo Alto, California
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RAINBOWfest is the only computer show exclusively dedicated to your Tandy Color Computer. Nowhere else will you see as many products, have access to the top experts, or be able to attend free seminars. It's the next best thing to receiving the latest issue of THE RAINBOW in your mailbox!

Every RAINBOWfest features many delightful surprises. It's a great opportunity for commercial programmers to show off new and innovative products for the first time. You get the jump on new capabilities for your CoCo. In exhibit after exhibit, there are demonstrations, opportunities to experiment with software and hardware, and special RAINBOWfest prices.

You can set your own pace between visiting exhibits and attending the valuable, free seminars on all aspects of your CoCo — from improving BASIC skills to working with the sophisticated OS-9 operating system.

Many of the people who write for THE RAINBOW — as well as those who are written about — are there to meet you and answer your questions. You'll also meet lots of other people, just like you, who share your interest in the Color Computer. It's a person-to-person event, as well as a tremendous learning experience, in a fun and relaxed atmosphere.

To make it easier for you to participate, we schedule RAINBOWfests in three parts of the country. If you missed the fun in Princeton, N.J., why don't you make plans now to join us in Palo Alto, Calif.? For members of the family who don't share your affinity for CoCo, you'll be comfortable knowing that RAINBOWfest is located in an area with many other attractions.

The Hyatt Hotels - Palo Alto offer special rates ($71, single or double room) for RAINBOWfest. The show opens Friday evening with a session from 7 p.m. to 10 p.m. It's a daytime-only show Saturday — the CoCo Community Breakfast (separate tickets required) is at 8 a.m., then the exhibit hall opens promptly at 10 a.m. and runs until 6 p.m. There will be no exhibition hours or seminars Saturday evening. On Sunday, the OS-9 Users Group will host a breakfast at 9 a.m. (separate tickets required). The exhibit hall opens at 11 a.m. and closes at 4 p.m.

A well-known speaker will again keynote the highly popular CoCo Community Breakfast. These traditional gatherings allow you to stay abreast of significant CoCo Community happenings in an ntimate setting.

Tickets for RAINBOWfest may be obtained directly from THE RAINBOW. We'll also send you a special reservation form so you can get your special room rate.

Come to RAINBOWfest!

PCMfest Your admission to RAINBOWfest also entitles you to visit PCMfest! It's a show focusing on Tandy's new generation of computers — the Tandy 1000, 1200, 2000 and 3000 MS-DOS computers, and the Tandy 100, 200 and 600 portables.

PCMfest is sponsored by our sister publication, PCM, *The Personal Computer Magazine for Tandy Computer Users.* The show will be in the same location as RAINBOWfest and the exhibit hours will be exactly the same. If you use one of the newer Tandy computers, don't miss it.

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Marty Goodman
Owner of Cheshire Cat Software
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Steve Bjork
Owner of SRB Software
"User Interfaces"

Brian Lantz
National OS-9 Users Group President
"OS-9 Technical Topics"

Dale L. Puckett
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"Beginners' Tour of OS-9 and BASIC09"

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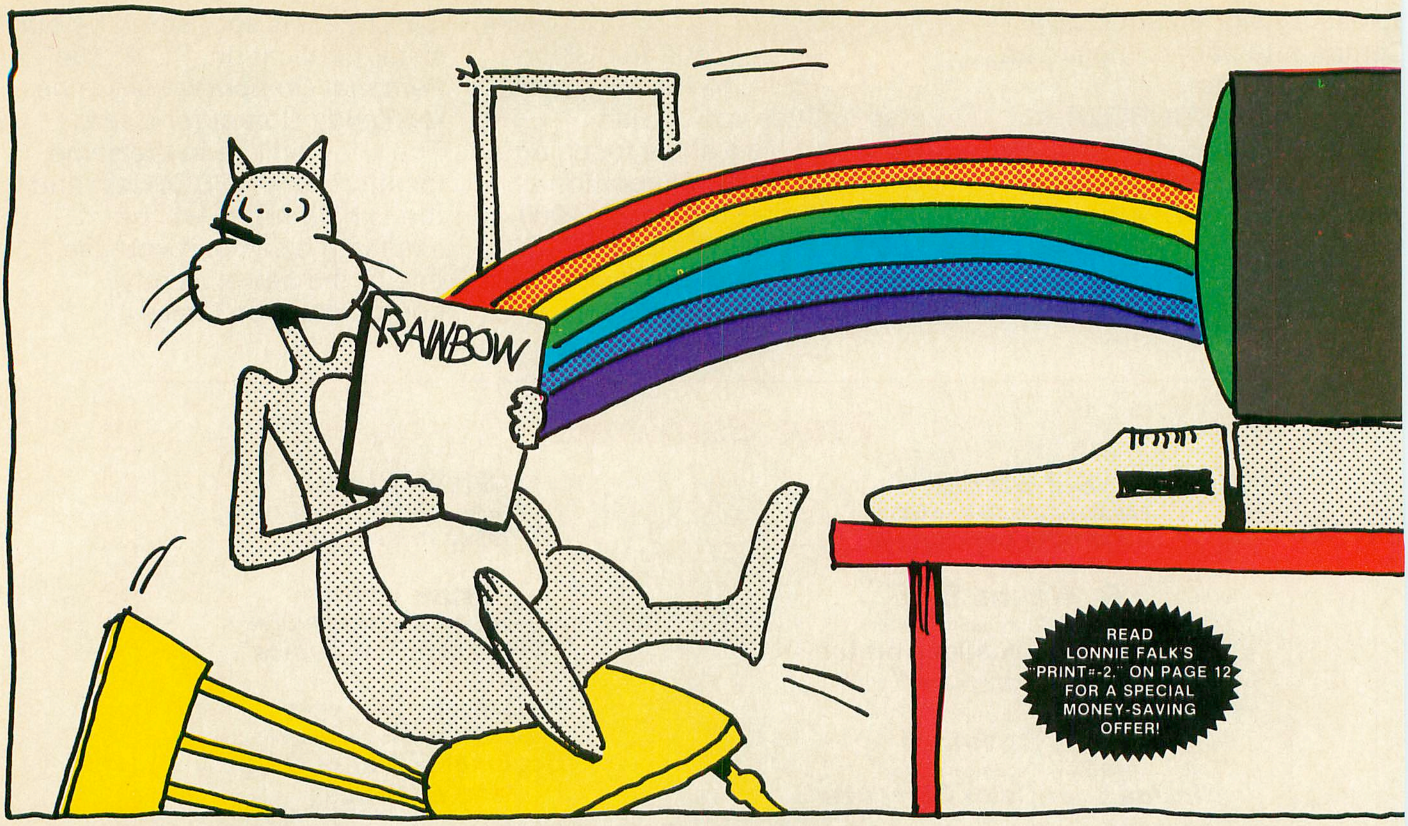
Make checks payable to: The RAINBOW. Mail to: RAINBOWfest, The Falsoft Building, P.O. Box 385, Prospect, KY 40059. To make reservations by phone, call: (502) 228-4492.

Advance ticket deadline: February 7, 1986. Orders received less than two weeks prior to show opening will be held for you at the door. Tickets will also be available at the door at a slightly higher price. Tickets will be mailed six weeks prior to show. Children 4 and under, free; over 4, full price.



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Resolve to keep track of special dates this new year with an electronic calendar that never forgets

Livin' On CoCo Time

By Mark S. Sullins

Have you ever forgotten to call your mother on her birthday or missed a doctor's appointment because the tiny space on your calendar was so filled with notes that none of them were legible any more? These are the type of problems CoCo can cure by using an electronic calendar/clock program.

If you leave *Caltime* on constantly, it will run correctly until 12:01 a.m. on January 1, 2000, but that shouldn't be necessary because your notes are saved on disk and displayed on their appropriate date. I chose to allow the notes to be displayed regardless of the year in which they are typed; that way, you will not have to retype the birthday reminders each year. You will need to delete doctor's appointments and other non-annual notes each year.

Caltime is organized into two sections. The first one (lines 40-210) is the "note pad" section. You can add a new note, change an existing note or delete an old note. The second section (lines 5000-5400) is the calendar/clock display section. The display screen is organized in the following way:

Line 1 displays the date and the day of the week.

Line 2 displays the clock that will blink each second.

Lines 3-11 display your notes for that day (if there are any in the *NOTES/CAL* file).

Lines 12-16 display a calendar for the current month.

The time and date are set by the user so information for a date, other than the current one, can be displayed. The program is ended by hitting the '@' key. A word of warning here: *Caltime* clears all memory (including the program itself) when it ends, so be sure to save the program before you run it.

Lines 5410-5470 are a subroutine, which may also be useful in other programs that use dates. On entry, the values for the month, day and year (two digits) should be in MO, DA and YE, respectively. Also, the Array M must contain the data values found in Line 5120 (number of days in each month). The subroutine returns two values, DT and DA. DT is the numeric representation of that date (1-365); DN is the day of the week for that data, with '1' being Sunday and '7' being Saturday.

(You may contact Mark with any questions about this program at 138 Redbud Estates, Manhattan, KS 66502, phone 913-537-0243. Please include an SASE when writing.) ☐

(Mark Sullins, who has a bachelor's degree in science, works at Kansas State University. He and his wife, DeAnn, also run a home day care center. He uses a lot of his computer knowledge writing programs for the preschoolers.)

100	127
190	212
5180	212
5330	193
5430	104
END	15

The listing: CALTIME

```
10 CLS:CLEAR 1000:DIM M(12),WK$(
7)
12 FOR I=1 TO 7:READ WK$(I):NEXT
I:FOR I=1 TO 12:READ M(I):NEXT I
15 OPEN "D",#1,"NOTES.CAL",133:F
IELD#1,5AS A$,128 AS B$:LR=LOF(1
)+1
20 PRINT"DO YOU WANT TO...
          [1] MAKE/CHANGE CALENDE
R NOTES   [2] START CLOCK CALENDA
R"
30 R$=INKEY$:IF NOT(R$="1" OR R$
="2") THEN 30 ELSE IF R$="2" THE
N 5000
```

```
40 CLS:PRINT"NOW DO YOU WISH TO.
..              [1] ADD A NEW NOTE
                [2] CHANGE OR DELET
E AN EXISTINGNOTE"
45 R$=INKEY$:IF NOT(R$="1" OR R$
="2") THEN 45 ELSE IF R$="2" THE
N 100
50 INPUT"WHAT DATE IS THIS NOTE
FOR (MONTH,DATE,YEAR)";MO,DA,YE:
GOSUB 5410
60 PRINT "TYPE IN YOUR NOTE FOR
";CHR$(13);MO;"-";DA;"-";YE
70 LINE INPUT X$
80 LSET A$=MKN$(DT):LSET B$=X$:P
UT #1,LR:LR=LR+1
90 CLS:GOTO 20
100 CLS:PRINT "DO YOU KNOW THE D
ATE OF THE NOTEWHICH NEEDS CHANG
ING?"
105 DT=0
110 R$=INKEY$:IF R$="N" OR R$="n
" THEN 130 ELSE IF NOT(R$="Y" OR
 R$="y") THEN 110
120 INPUT "ENTER THE DATE WHICH
NEEDS     CHANGING (MONTH,DAY,Y
EAR)";MO,DA,YE:GOSUB 5410
130 CLS:R=1
135 IF R>LOF(1) THEN PRINT"NO MO
RE NOTES":FOR J=1 TO 460*10:NEXT
 J:CLS:GOTO 20
140 GET #1,R:IF DT<>0 THEN RD=CV
N(A$):IF DT<>RD THEN R=R+1:GOTO
135
145 RD=CVN(A$):IF RD=0 THEN R=R+
1:GOTO 135
150 CLS:PRINT B$;"PRESS C TO CHA
NGE THIS NOTE OR  PRESS L TO LOO
K FOR ANOTHER"
160 R$=INKEY$:IF R$="L" OR R$="l
" THEN R=R+1:GOTO 135 ELSE IF NO
T(R$="C" OR R$="c") THEN 160
170 PRINT"D=DELETE THIS NOTE FRO
M THE FILEC=CHANGE THIS NOTE"
180 R$=INKEY$:IF R$="C" OR R$="c
" THEN 200 ELSE IF NOT(R$="D" OR
 R$="d") THEN 180
190 LSET A$=MKN$(0):LSET B$="":P
UT #1,R:CLS:GOTO 20
200 PRINT "ENTER THE NOTE WHICH
SHOULD     REPLACE THIS ONE"
210 LINE INPUT X$:LSET B$=X$:PUT
#1,R:CLS:GOTO 20
5000 CLS
5040 DATA SUNDAY,MONDAY,TUESDAY,
WEDNESDAY,THURSDAY,FRIDAY,SATURD
AY
5050 PRINT "ENTER THE DATE AS 01
-01-85"
5060 INPUT D$
5070 IF LEN(D$)<>8 THEN 5050
5080 MO=VAL(LEFT$(D$,2)):DA=VAL(
MID$(D$,4,2))
5090 YE=VAL(RIGHT$(D$,2))
5120 DATA 31,28,31,30,31,30,31,3
1,30,31,30,31
5130 IF INT((YE-84)/4)=(YE-84)/4
 THEN M(2)=29
5140 GOSUB 5410
5150 CLS:PRINT D$,WK$(DN)
5160 RD$=D$:RD=DN:INPUT "TIME (H
R:MIN:AM OR PM";HR,MI,AP$:TIMER=
0
5170 IF HR<1 OR HR>12 OR MI<0 OR
 MI>60 OR NOT(AP$="AM" OR AP$="P
M") THEN 5160
5180 CLS:PRINT RD$:PRINT@31-LEN(
WK$(RD)),WK$(RD):PRINT@293," S
M  T  W  T  F  S  "
5190 DA=1:GOSUB 5410:C=0:IF DN>1
 THEN FOR I=2 TO DN:L$=L$+"   ":
NEXT I
5200 C=C+1:IF LEN(L$)=21 THEN PR
INT STRING$(4," ");L$:L$=""
5210 IF C<10 THEN X$=" "+STR$(C)
 ELSE X$=STR$(C)
5220 L$=L$+X$
5230 IF C<M(MO) THEN 5200
5240 PRINT"    ";L$
5250 GOSUB 6000
5260 S=INT(TIMER/60):TIMER=TIMER
-(INT(TIMER/60)*60)
5270 PRINT@32,STRING$(32,175);:P
RINT@43,HR;":";MI;":";AP$;
5275 R$=INKEY$:IF R$="@" THEN CL
OSE#1:CLEAR 200:CLS:EXEC 49152
5280 IF TIMER <60 THEN 5280
5290 TIMER=TIMER-60
5300 S=S+1:IF S=60 THEN MI=MI+1:
S=0:IF MI=60 THEN HR=HR+1:MI=0:I
F HR=13 THEN HR=1
```

Hint . . .

Verify Tape Saves

To verify that a file (BASIC, machine language or even a data file) has been saved properly on cassette, rewind the tape to the beginning of the file, type `SKIPF` and ENTER, and press the Play button. If there are any I/O errors the I/O ERROR message will come up and the tape will stop; you can try another save since this process has no effect on anything that might be in memory.

```
5310 IF HR=12 AND MI=0 AND S=0 A
ND AP$="AM" THEN AP$="PM" ELSE I
F HR=12 AND MI=0 AND S=0 THEN  A
P$="AM":GOTO 5330
5320 GOTO 5270
5330 DC=VAL(MID$(RD$,4,2))+1:IF
DC>M(MO) THEN MO=MO+1:DC=1
5340 IF MO<10 THEN MID$(RD$,1,2)
="0"+RIGHT$(STR$(MO),1) ELSE MID
$(RD$,1,2)=RIGHT$(STR$(MO),2)
5350 IF DC<10 THEN MID$(RD$,4,2)
="0"+RIGHT$(STR$(DC),1) ELSE MID
$(RD$,4,2)=RIGHT$(STR$(DC),2)
5360 IF MO=13 THEN 5390
5370 DA=DC:GOSUB 5410:RD=DN
5380 GOTO 5180
5390 FOR I=1 TO 60:CLS(RND(9)-1)
:PRINT@233,"HAPPY NEW YEAR";:FOR
 J=1 TO 460:NEXT J,I
5400 D$="01-01-"+STR$(VAL(RIGHT$
(RD$,2))+1):MO=1:DA=1:YE=VAL(RIG
HT$(D$,2)):GOSUB5410:RD$=D$:RD=D
N:HR=12:MI=1:AP$="AM":TIMER=0:GO
TO 5180
5410 Y2=YE-85:Z=INT((YE-85)/4):Y
2=Y2+Z:Y2=Y2-INT(Y2/7)
5420 DT=0:IF MO=1 THEN 5430 ELSE
 FOR I=1 TO MO-1:DT=DT+M(I):NEXT
 I
5430 DT=DT+DA:WN=INT((DT+(2+Y2))
/7):IF Y2>=4 THEN WN=WN-1
5440 DN=(DT-(WN*7)+2+Y2)
5450 IF DN=0 THEN DN=7
5460 IF DN>7 THEN DN=DN-7:GOTO 5
460
5465 IF INT((YE-84)/4)=((YE-84)/
4) AND MO>2 THEN DT=DT-1
5470 RETURN
6000 MO=VAL(MID$(RD$,1,2)):DA=VA
L(MID$(RD$,4,2)):YE=VAL(RIGHT$(R
D$,2)):GOSUB 5410
6010 LL=0:L$="":FOR I=1 TO LOF(1
):GET #1,I:A=CVN(A$):IF A<>DT TH
EN 6100
6015 IF LL=1 THEN 6100
6020 L$=L$+B$:J=LEN(L$)
6030 IF MID$(L$,J,1)=" " THEN J=
J-1:GOTO 6030
6040 L$=LEFT$(L$,J+1):J=LEN(L$):
J2=INT(J/32)*32:IF J2=J THEN 610
0
6045 IF J2>=256 THEN LL=1:GOTO 6
050 ELSE LL=0
6050 L$=L$+STRING$(32+J2-J,32)
6100 NEXT I:PRINT@64,L$;:L$="":R
ETURN
```

MUL-T-SCREEN

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With six "programs" in one, you have different choices for your program title page or for clearing the screen . . .

Presenting The Star Of The Show — Screen Alternatives

By Bill Bernico

Tired of the same ol' beginnings to your programs? You know — `CLS:PRINT @ 100, "MY PROGRAM"`. Well, now you can spruce up the title page and discover new ways to clear your screen instead of using `CLS`.

Upon running *Screen*, you are presented with a menu containing six choices. Selection numbers 1, 3, 4 and 5 show alternative ways to present your title page, and numbers 2 and 6 demonstrate new ways to clear the screen. Each selection is in itself a stand-alone program. That is, you can take lines 300-510, for example, and adapt them to your own program. These lines make up selection number 1. Selection number 2 can be "pulled out" of the main program by using lines 530-590, and so on.

I'm always working on new ways to do old tasks, but these are my six favorites so far. Feel free to use them or improve them in any way you like. Make your program stand out and give it the recognition it deserves.

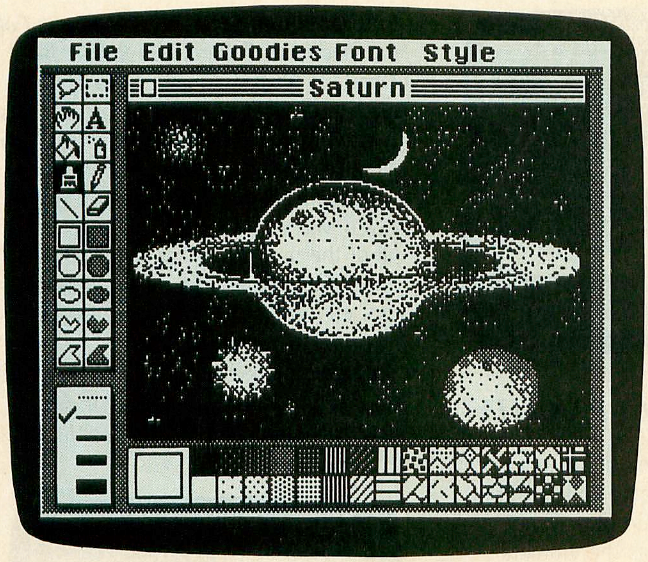
(Questions you have about this program may be directed to the author at 708 Michigan Ave., Sheboygan, WI 53081. Please enclose an SASE.) □

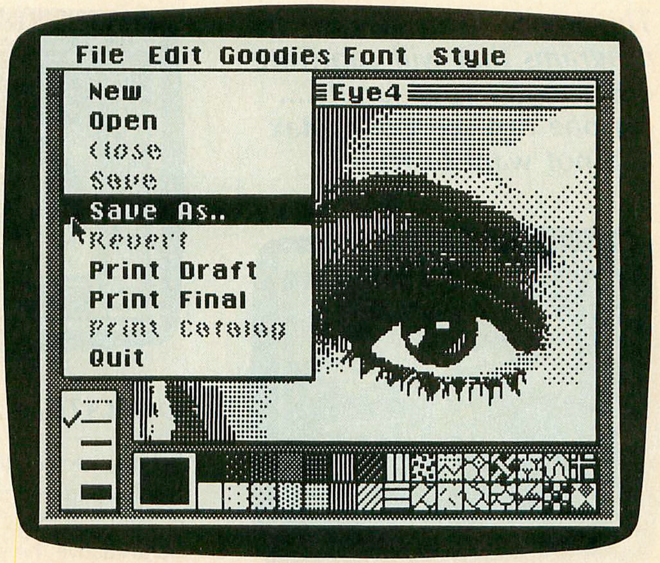
150	12
260	32
500	6
710	231
910	63
1040	85
1190	164
END	150

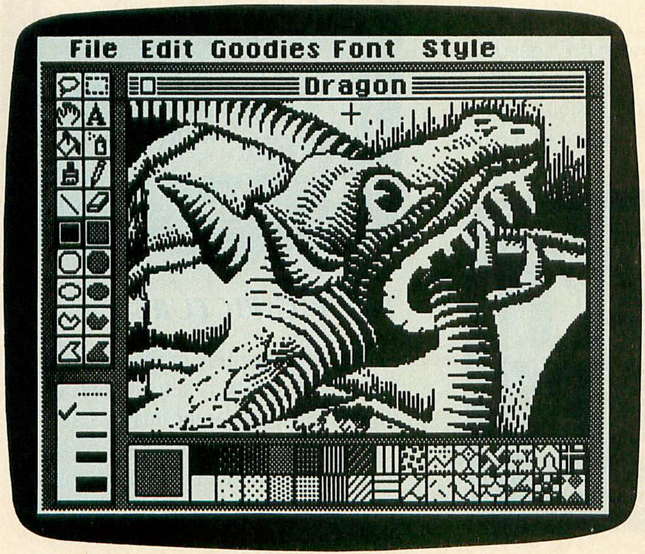
The listing: SCREEN

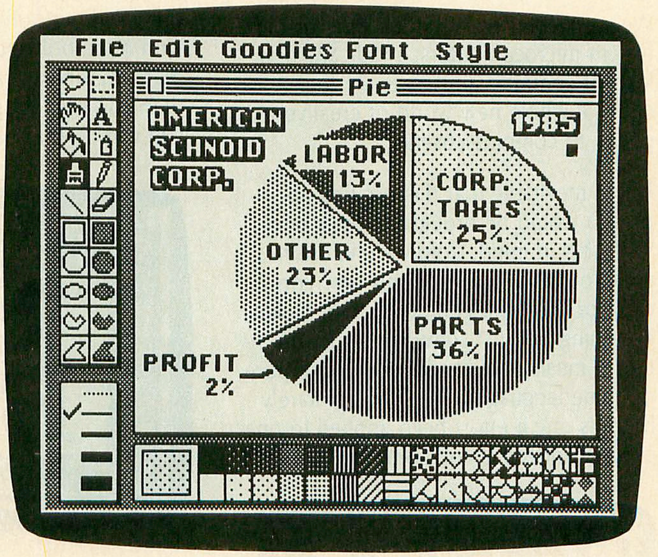
```
10 'SCREEN PRESENTATIONS
20 'BY BILL BERNICO
30 '708 MICHIGAN AVE.
40 'SHEBOYGAN, WI 53081
50 '(414) 459-7350
60 '
70 PMODE 4,1:PCLS5:SCREEN 1,1:CO
LOR 0,1
80 DRAW"BM40,28S2;U12H4L28G4D20F
26D4G4L12H4U4L8D12F4R32E4U12H26U
8E4R8F4R8":PAINT(39,27),0,0:SOUN
D 100,2
```

CoCo Max


File Edit Goodies Font Style
Saturn


File Edit Goodies Font Style
Eye4
New
Open
Close
Save
Save As..
Revert
Print Draft
Print Final
Print Catalog
Quit


File Edit Goodies Font Style
Dragon

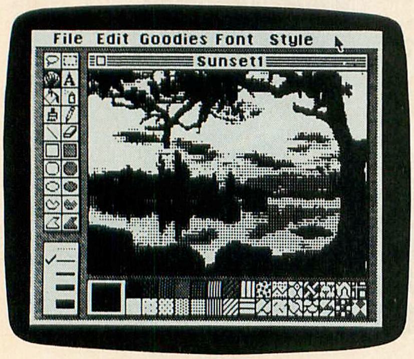

File Edit Goodies Font Style
Pie
AMERICAN
SCHNOID
CORP.
1985
LABOR 13%
CORP. TAXES 25%
OTHER 23%
PARTS 36%
PROFIT 2%

Take your CoCo to the MAX.

COLORWARE

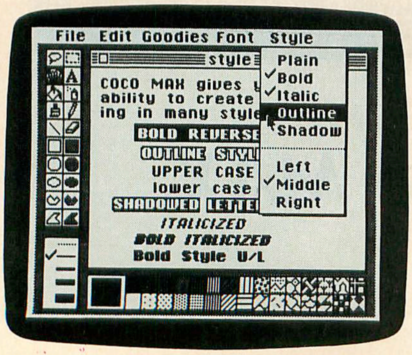
CoCo Max

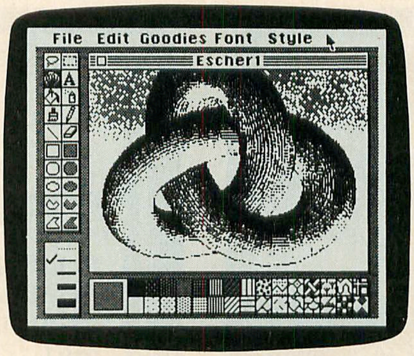
This is one of those rare programs that will captivate everyone in your family.... No one can see CoCo Max and not want to try it!


File Edit Goodies Font Style
Sunset1

We are all witnessing an exciting revolution in microcomputers: a radically new kind of computer and software that opens a whole new world of creative power to computer users.

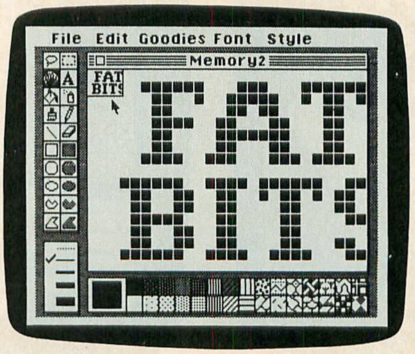
It was inevitable that this exciting approach would be brought to the CoCo. With this in mind, Colorware chose to go all out and maximize this new concept for the color computer. That meant designing not just software but hardware too. It meant thousands of hours of pure machine language programming. Rarely has this much effort been applied to one product for the Color Computer.


File Edit Goodies Font Style
style
COCO MAX gives
ability to create
ing in many style
BOLD REVERSE
OUTLINE STYL
UPPER CASE
lower case
SHADOWED LETTE
ITALICIZED
BOLD ITALICIZED
Bold Style U/L
Plain
✓Bold
✓Italic
Outline
Shadow
Left
✓Middle
Right


File Edit Goodies Font Style
Escher1

UNMATCHED CAPABILITY...

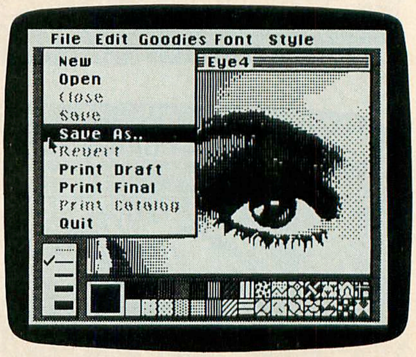
Because we took the maximum approach: highly optimized machine code combined with hardware, CoCo Max truly stands above the rest as the ultimate creative tool for the Color Computer. It's unrivaled performance lets you create with more brilliance and more speed than any similar system – much more than you ever imagined possible. And, you can do it in black & white or color.


File Edit Goodies Font Style
Memory2
FAT BITS
FAT
BITS

All the sophisticated power of the bigger systems is there: ***Icons, Pull-Down Menus,*** full ***Graphic Editing, Font Styles,*** and all kinds of handy tools and shortcuts.

Plug your joystick, mouse or touch pad into CoCo Max's Hi-Res Input Unit. Then use a delightfully simple ***Point-and-Click*** method to get any of CoCo Max's powerful graphic tools. It has them all:

You can ***Brush, Spray*** or ***Fill*** with any ***Color, Shading*** or ***Pattern.*** Use ***Rubber Band Lines*** and ***Shapes*** (square, rectangle, circle, elipse, etc.) to create perfect illustrations with speed and ease. There's a ***Pencil,*** an ***Eraser*** and even a selection of ***Caligraphy Brushes.*** And, as you can see, CoCo Max can do a lot with text.
All of the newest special effects are there: ***Trace Edges, Flip, Invert, Brush Mirrors,*** etc. And all of the very latest super-capabilities like: ***Undo,*** which automatically reverses your mistakes, and ***Fat Bits*** which zooms you way in on any part of your subject to allow dot-for-dot precision.


File Edit Goodies Font Style
Eye4
New
Open
Close
Save
Save As..
Revert
Print Draft
Print Final
Print Catalog
Quit

THE BIG PICTURE

The large image box in the middle of the CoCo Max screen is actually only a window on an even larger image. Use the Point-and Click "Hand" to effortlessly move your window over any portion of the larger image. You have a working area of up to 3-½ times the area of the window itself.

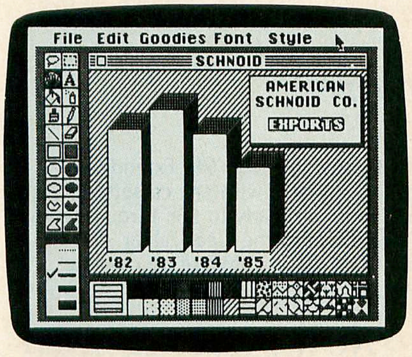
FLEXIBLE PRINTING...

CoCo Max gives you many ways to print. Fill a whole page with your image or condense two full CoCo screens to less than ¼ page for a finely detailed copy. "Dump" your CoCo Max screen full size or shrink it to ⅛ page size.

THE COCO MAX SYSTEM

FREEDOM TO CREATE...

Anyone who wants to create anything at all on their CoCo screen or printer will certainly be very glad to meet CoCo Max. CoCo Max's friendly yet sophisticated graphic and text capabilities let you almost instantly produce illustrations, diagrams, charts, graphs, and computer art – for serious use or just for creative fun.

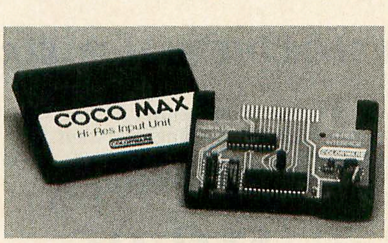


AN ABSOLUTE GUARANTEE

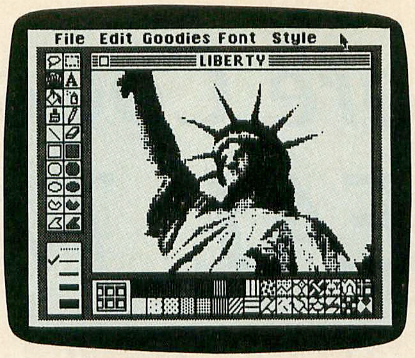
CoCo Max is a hardware/software system that no software-only system can match. Get CoCo Max and see your CoCo perform as it never could before. If you don't agree that CoCo Max is the ultimate creative tool for the Color Computer, simply return it within 20 days for a full, courteous refund from Colorware.

THE HARDWARE...

This is the key to CoCo Max's unmatched performance. Did you know the normal joystick input built into the Color Computer only allows access to 4,096 (64 x 64) points on the CoCo screen? Yet, the Color Computer's high resolution screen has 49,152 (256 x 192) pixels. This means that a joystick, mouse or even a touch pad can, at best, only access about one tenth of the pixels on the CoCo screen.



Most graphic programs ignore this hardware limitation of the Color Computer and give you only low-res control. Others attempt to overcome the limitation by using software schemes such as sliding windows. Although clever, these schemes yield sluggish and awkward results. Only CoCo Max does it the right way. The CoCo Max Hi-Res Input Unit plugs into your ROM slot and adds an entirely new joystick input to your computer – a precision one with a 49,152 point resolution to match the CoCo screen exactly.

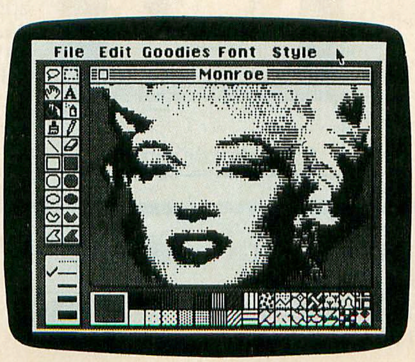


Plug your same joystick, mouse or touch pad into this new input and you have a whole new kind of control. The difference is remarkable.

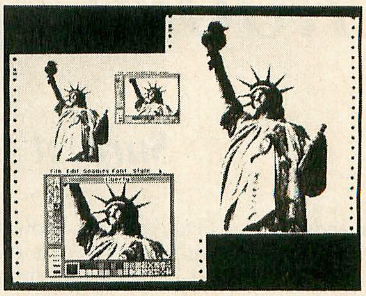
COCO MAX
CoCoMax

A DIGITIZER OPTION...

We studied all the video digitizers available and picked the best of them to link with CoCo Max. The DS-69 from Micro Works was our choice. This optional device lets you capture the image from any video source (video recorder, camera, etc.) on your Color Computer.



You may then use CoCo Max's graphic magic on it. The DS-69 is available as an option from Colorware from $149.95 complete with its own software on disk or tape. Using the DS-69 with a disk requires an RS multi-pak adaptor.



COCO MAX REQUIREMENTS

The CoCo Max System includes the Hi-Res Input Unit, software on disk or cassette (please specify) and user manual. It will work on any 64K Extended or non-extended Color Computer. You'll need a Radio Shack or equivalent joystick, mouse or touch pad. Disk systems require a Multi-Slot Interface or Y-Branching Cable.

THE COMPLETE COCO MAX SYSTEM,
with software on ***DISK***...........***$69.95***

with software on ***CASSETTE*** (Available Mar '85).........................***$69.95***

Y-BRANCHING CABLE-If you have a disk system but do not have a Multi-Slot Interface, use this economical 40-pin, 1 male, 2 female cable to connect the CoCo Max Hi-Res input unit and your disk controller to your CoCo.....***$27.95***

Sorry, COCO MAX is not compatible with JDOS

COLORWARE

Colorware Inc.
78-03F Jamaica Ave.
Woodhaven, NY 11421
(718) 647-2864

VISA
MasterCard

ORDERING INFORMATION

ADD $3.00 PER ORDER FOR SHIPPING AND HANDLING.
C.O.D.'S ADD $3.00 EXTRA.
SHIPPING AND HANDLING FOR CANADA IS $5.00
WE ACCEPT VISA, MASTER CARD, M.O.'S, CHECKS.
N.Y. RESIDENTS MUST ADD SALES TAX.

Why do more CoCo owners choose 'REAL TALKER'?

Sure it's priced right, but there's more...

Thousands of 'Real Talker' owners know 'Real Talker' beats ALL other Coco voice synthesizers in ease of use and flexibility. And, NO other Coco talker has a clearer, more intelligible voice. That's quite a lot of advantage when you consider Real Talker's unbeatable price. Yet, Real Talker has some important features that you simply will not find in other Coco talkers:

'SAY' command - You'll have your computer talking brilliantly in just minutes thanks to this powerful new command. Type SAY "ANYTHING YOU WANT" and your words are instantly spoken. It's that simple. Think how easy this makes creating speaking Basic programs. Adding speech to your existing programs is a snap too.

'CONVERT' - This is a truly powerful command for the basic programer. CONVERT automatically transforms a machine language dependent speaking program into a stand-alone Basic program. In other words, you can effortlessly write speaking Basic programs that do not require a machine language translator in memory. This is a unique feature of 'Real Talker'. No other voice synthesizer gives you anything even remotely approaching this type of capability - even synthesizers costing considerably more.

COLORWARE
'REAL TALKER'
INSTRUCTION
'REAL TALK
HARDWARE VOI
SYNTHESIZER
COLORWARE

'Real Talker' is a full-featured electronic voice synthesizer unit built into a compact cartridge case. You simply plug it into the side of your computer.

Other features include software controlled pitch, unlimited vocabulary text-to-speech, and even a program that will recite any ASCII file (such as from Telewriter-64 & other word processors). You also get Colorware's unique full-screen phoneme editor program that let's you experiment with and modify speech at it's most fundimental level.

'Real Talker' is compatible with any 16K, 32K, 64K Extended or non-extended Color Computer. It works with any cassette or disk system and comes complete and ready to talk through your T.V. or monitor speaker. Price includes the 'Real Talker' electronic voice synthesizer in a ROM pack, software on cassette (may be transferred to disk), and user manual.

NOW INCLUDED WITH 'REAL TALKER'........

1. ***'DR. TALK***-This interactive "Eliza" type psychoanalyst program will discuss your innermost problems at length.
2. ***'TALKING BATTLESHIP'***-It's you vs. the computer in this speaking version of the classic game.
3. ***'TALKING BLACKJACK'***- Play for big stakes against a rather talkative casino dealer.

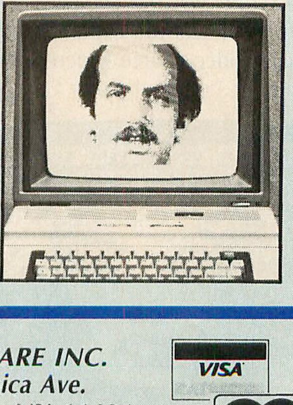
ONLY

$\$59^{95}$

'REAL TALKER-1' (for the original Color Computer)..............	***$59.95***
'REAL TALKER-2' (for the Color Computer-2).........................	***$64.95***
'Y - BRANCHING CABLE' For disk systems. If you have a disk system but do not have a Radio Shack Multi-Slot unit, this economical cable will allow to connect and use your Real Talker and Disk system together....................................	***27.95***

TALKHEAD

If you have a 'Real Talker', do not deprive yourself of this absolutely incredible machine-language Talking Head simulation program. While other talking head simulations use a minimal cartoon-like face, TALKHEAD uses high resolution, full-screen, digitized images of an actual person's face to create a life-like animated effect.



ACTUAL UNRETOUCHED PHOTO

SOFTWARE FOR THE 'REAL TALKER'

TALKHEAD can be easily commanded in Basic to appear on screen and say anything you want. Available on cassette or disk for only $19.95, TALKHEAD requires 64K and a Colorware 'Real Talker'.

ONLY $\$19.95$

COLORWARE

COLORWARE INC.
78-03F Jamaica Ave.
Woodhaven, NY 11421
(718) 647-2864

VISA

MasterCard

★ ★ ★ ORDERING INFORMATION ★ ★ ★

ADD $3.00 PER ORDER FOR SHIPPING AND HANDLING.
C.O.D.'S ADD $3.00 EXTRA.
SHIPPING AND HANDLING FOR CANADA IS $5.00
WE ACCEPT VISA, MASTER CARD, M.O.'S, CHECKS.
N.Y. RESIDENTS MUST ADD SALES TAX.

```
90 DRAW"BM76,28S2;U12H4L28G4D57F
4R28E4U16L8D8G4L12H4U40E4R12F4D4
R8":PAINT(74,45),0,0:SOUND 120,2
100 DRAW"BM92,20S2;D65R12U25F25R
16H25R12E8U24H8L40":DRAW"BM98,26
;D20R20E4U12H4L20":PAINT(93,21),
0,0:SOUND 140,2
110 DRAW"BM132,20S2;D65R32U12L16
U14R8U14L8U14R16U12L32":PAINT(13
3,21),0,0:SOUND 160,2
120 DRAW"BM162,20;D65R32U12L16U1
4R8U14L8U14R16U12L32":PAINT(163,
21),0,0:SOUND 180,2
130 DRAW"BM192,20S2;D65R16U36F36
R14U65L16D39H38L10":PAINT(193,21
),0,0:SOUND 200,2
140 DRAW"BM28,90S2;D48R25E7U14H7
L25BR40F23BE23G46BE46BR40BU38D66
R25E9U19H9L25BR25E9U19H9L25BR64D
66BU66BR34D66R43BU66BR34D66R43BL
219BD20D66R25E9U19H9L25BR25E9U19
H9L25BR75L25D66R25BU33BL10L15BR4
0BD33U66R25F9D18G9L25F33BR20U66F
46D20U66BR20D66
150 DRAW"BR53BU66BD8U8L33D66R33U
8BD8BR20U66R33D66L33
160 FOR X=1 TO 1500:NEXT X
170 C$=CHR$(128):V$=CHR$(159):B$
=CHR$(175):N$=CHR$(191):M$=CHR$(
207):K$=CHR$(239):L$=CHR$(255)
180 CLS0:PRINT@33,"choose";C$;"f
rom";C$;"these";C$;"design";C$;"
ideas";C$;
190 PRINT@131,V$;"<1> BORDER FLA
SH ";V$;
200 PRINT@164,B$;"<2> DISAPPEARI
NG ";B$;
210 PRINT@197,N$;"<3> FLASH ORAN
GE ";N$;
220 PRINT@230,M$;"<4> COLOR TITL
ES ";M$;
230 PRINT@263,L$;"<5> REPLACEMEN
TS ";L$;
240 PRINT@296,K$;"<6> ROLLING BA
CK ";K$;
250 PRINT@329,M$;"**************
***";M$;
260 PRINT@362,V$;"choose 1-6 OR
eND";V$;
270 A$=INKEY$:IF A$="E"THEN CLS:
END
280 A=VAL(A$):ON A GOTO 300,530,
610,830,1060,1320
290 GOTO 270
300 CLS0:PRINT STRING$(32,201);
310 FOR X=63 TO 510 STEP 32
320 PRINT@X,CHR$(201);:NEXT X
330 PRINT@480,STRING$(31,201);
340 POKE 1535,201
350 FOR X=448 TO 32 STEP-32
360 PRINT@X,CHR$(201);:NEXT X
370 FOR Y=1 TO 3
380 POKE 359,126:SOUND 191,2
390 PRINT@74,"bill";C$;"bernico"
;
400 PRINT@140,"presents";
410 PRINT@199,"another";C$;"amaz
ingly";
420 PRINT@268,"simple";
430 PRINT@359,"SCREEN";C$;"PRESE
NTATION";
440 PRINT@428,"PROGRAM";
450 FOR X=1 TO 350:NEXT X
460 POKE 359,57:SCREEN 0,1
470 SOUND 159,2
480 FOR X=1 TO 350:NEXT X
490 NEXT
500 POKE 359,126:CLS
510 FOR X=1 TO 300:NEXT X
520 GOTO 170
530 CLS:PRINT@100,"TRY THIS METH
OD FOR             CLEARING THE
SCREEN.            IT'S CERTAINL
Y OUT              OF THE ORDINA
RY AND             IT HOLDS YOUR
 ATTEN-            TION BETTER T
HAN A              PLAIN OLD 'CL
S' COM-            MAND.
540 PRINT@392,"HIT ANY KEY
550 EXEC 44539
560 FOR Y=100 TO 402 STEP 2:PRIN
T@Y,CHR$(143);
570 PRINT@Y,CHR$(32);:NEXT Y
580 FOR O=1 TO 700:NEXT O
590 FOR P=101 TO 464 STEP 2:PRIN
T@P,CHR$(143);:NEXT P
600 GOTO 170
610 FOR Y=1 TO 3
620 FOR X=1 TO 1000:NEXT X:CLS0
630 SOUND 140,1
640 PRINT@3,STRING$(7,255);
650 PRINT@69,STRING$(9,255);
660 PRINT@135,STRING$(6,255);
670 PRINT@201,STRING$(6,255);
680 PRINT@267,STRING$(12,255);
690 PRINT@333,STRING$(2,255);
700 PRINT@399,STRING$(4,255);C$;
STRING$(7,255);
710 FORX=1 TO 500:NEXT X:CLS0
720 SOUND 191,1
730 PRINT@3,"another";
740 PRINT@69,"amazingly";
750 PRINT@135,"simple";
760 PRINT@201,"screen";
770 PRINT@267,"presentation";
780 PRINT@333,"by";
790 PRINT@399,"bill";;C$;"bernic
o";
```

```
800 NEXT Y
810 FOR X=1 TO 500:NEXT X
820 GOTO 170
830 CLS0
840 FOR X=3 TO 13:SET(X,4,1):NEX
T X
850 FOR X=4 TO 11:SET(8,X,1):SET
(7,X,1):SET(18,X,2):SET(19,X,2):
SET(28,X,3):SET(29,X,3):SET(38,X
,4):SET(39,X,4):SET(50,X,5):SET(
51,X,5):NEXT X
860 FOR X=24 TO 33:SET(X,4,3):NE
XT X
870 FOR X=39 TO 45:SET(X,11,4):N
EXT X
880 FOR X=51 TO 57:SET(X,11,5):S
ET(X,4,5):NEXT X
890 FOR X=51 TO 55:SET(X,8,5):NE
XT X
900 FOR X=16 TO 23:SET(12,X,5):S
ET(13,X,5):SET(48,X,2):SET(49,X,
2):NEXT X
910 FOR X=14 TO 17:SET(X,16,5):S
ET(X,20,5):NEXT X
920 FOR X=17 TO 19:SET(18,X,5):S
ET(19,X,5):NEXT X
930 FOR X=17 TO 23:SET(24,X,7):S
ET(25,X,7):SET(30,X,7):SET(31,X,
7):NEXT X
940 FOR X=26 TO 29:SET(X,16,7):S
ET(X,20,7):NEXT X
950 FOR X=17 TO 22:SET(36,X,8):S
ET(37,X,8):NEXT X
960 FOR X=38 TO 41:SET(X,16,8):S
ET(X,23,8):NEXT X
970 FOR X=40 TO 43:SET(X,21,8):N
EXT X:SET(42,17,8):SET(43,17,8):
SET(42,22,8):SET(43,22,8)
980 FOR X=50 TO 55:SET(X,16,2):S
ET(X,23,2):NEXT X
990 FOR X=50 TO 53:SET(X,20,2):N
EXT X
1000 Y=29:FOR X=1 TO 30
1010 SET(6,Y,1):SET(12,Y,2):SET(
18,Y,3):SET(24,Y,4):SET(30,Y,5):
SET(36,Y,6):SET(42,Y,7):SET(48,Y
,8):SET(54,Y,1):SET(60,Y,2)
1020 EXEC 43345
1030 RESET(6,Y):RESET(12,Y):RESE
T(18,Y):RESET(24,Y):RESET(30,Y):
RESET(36,Y):RESET(42,Y):RESET(48
,Y):RESET(54,Y):RESET(60,Y)
1040 NEXT X
1050 GOTO 170
1060 CLS:PRINT@131,STRING$(4,C$)
;" ";STRING$(2,C$);" ";STRING$(6
,C$);" ";STRING$(6,C$);" ";STRIN
G$(4,C$)
1070 GOSUB 1310
1080 PRINT@131,"this";B$;"is";B$
;"design";B$;"number";B$;"five
1090 GOSUB 1310
1100 PRINT@195,STRING$(3,C$);" "
;STRING$(6,C$);" ";STRING$(6,C$)
;" ";STRING$(2,C$);" ";STRING$(4
,C$)
1110 GOSUB 1310
1120 PRINT@195,"the";B$;"visual"
;B$;"effect";B$;"of";B$;"this";B
$;
1130 GOSUB 1310
1140 PRINT@259,STRING$(7,C$);" "
;STRING$(2,C$);" ";STRING$(4,C$)
;" ";STRING$(6,C$);" ";STRING$(3
,C$)
1150 GOSUB 1310
1160 PRINT@259,"pattern";B$;"is"
;B$;"very";B$;"unique";B$;"for
1170 GOSUB 1310
1180 PRINT@323,STRING$(6,C$);" "
;STRING$(12,C$);" ";STRING$(4,C$
)
1190 GOSUB 1310
1200 PRINT@323,"screen";B$;"pres
entation";B$;"uses";B$;B$;
1210 GOSUB 1310
1220 PRINT@99,STRING$(26,B$);
1230 FOR X=125 TO 380 STEP 32:PR
INT@X,B$;:NEXT X
1240 FOR X=381 TO 354 STEP-1:PRI
NT@X,B$;:NEXT X
1250 FOR X=354 TO 98 STEP-32:PRI
NT@X,B$;:NEXT X
1260 PRINT@163,STRING$(27,B$);
1270 PRINT@227,STRING$(27,B$);
1280 PRINT@291,STRING$(27,B$);
1290 GOSUB 1310
1300 GOTO 170
1310 FOR X=1 TO 800:NEXT X:EXEC
43345:RETURN
1320 CLS:PRINT@69,"THIS PROGRAM
WILL HELP          YOU TO SPRUCE
 UP YOUR           OWN PROGRAMS
BY GIVING          YOU A FLASHY
SCREEN             PRESENTATION
TO REPLACE         THE DULL, DRA
B, ORDINARY        TITLE PAGE.
1330 PRINT@293,"YOU CAN CHOOSE F
ROM SIX         EYE-APPEALING PA
TTERNS          TO BE YOUR TITLE
 PAGE.
1340 PRINT@421,"PRESS enter TO
                RETURN TO MENU
1350 EXEC 44539
1360 FOR Q=475 TO 69 STEP -1
1370 PRINT@ Q, CHR$(32)
1380 EXEC 43345:NEXT Q
1390 GOTO 170
```

DELPHI BUREAU

The Latest on Our Newest Dimension: the CoCo SIG

By John R. Curl
Rainbow's CoCo SIGOP

Welcome to "Delphi Bureau." As of November 19, 1985, the Color Computer Special Interest Group (CoCo SIG) on the Delphi Information Service had 1,262 members. THE RAINBOW is very excited and enthusiastic about sponsoring this SIG.

As SIGOP (Special Interest Group Operator), I am responsible for seeing that the CoCo SIG is the best that we can make it. If you have a question or problem, just drop me a message and I will either answer it myself or make the correct connection for you.

Once online and in the CoCo SIG, the Color Computer world is at your disposal. Delphi is designed to be self-explanatory. When you first sign on, Delphi is menu-intensive. This means at each prompt, everything you can do is precisely displayed for you on the screen in a menu in plain English. This is known as "prompt level three." This makes learning the commands very easy. Once you have become familiar with the commands, you can switch to one of two other prompt levels. Level two (`/P 2`) does not display a menu, but lists the options on the prompt line. Level one (`/P 1`) is for the experienced users. It gives you only the prompt. This increases the speed at which you move around in Delphi.

Another feature that saves time is the ability to use abbreviations. To initiate any command you just have to enter the fewest letters that makes your choice clear. For example, if you reach the CoCo SIG from the main menu, you can just type `G CO` instead of `GROUP COCO`. Most of the time only one letter is required. When more than one command begins with the same letter, you will need to use two or three letters.

At almost every prompt, typing `HELP` brings up a detailed help file on the available options. In some cases a ? will serve the same purpose. You may also type `HELP (OPTION)`, where `OPTION` is the function you want help with, and receive data on that particular subject.

If you need more detailed help or are having erratic response, then you should consult the "Advice from Delphi" section. At the MAIN> menu select "Using Delphi," then choose "Advice from Delphi." This section contains several text files on various topics.

Other help files are in the CoCo SIG database.

Also available online are the numerous experts in the CoCo Community. Almost every aspect of the CoCo is covered by these people. You can either leave them a message or maybe contact them live in conference. They are very friendly and helpful. Among these are:

Lonnie Falk (LFALK)
Jim Reed (JIMREED)
Dan Downard (DANDOWNARD)
Ed Ellers (EDELLERS)
Marty Goodman (MARTYGOODMAN)
Steve Bjork (6809ER)
Dale Puckett (DALEP)
Bob Rosen (WHIFFLE)
Brian Lantz (BRIANLANTZ)
Dennis Derringer (PCF)
Mike Ward (MIKEWARD)
Dick White (DICKWHITE)

The text in parentheses is the individual's "username" (ID) on Delphi. We will have conferences featuring some of these CoCo Community notables in the future.

If you have any problems or questions about your magazine subscription, RAINBOW ON TAPE, or any of the other RAINBOW products, you can receive help from any of the following usernames: RAINBOWMAG, FALSOFT or CURL. Also leave us any suggestions for the SIG that you might have. We feel Delphi allows us to solve your problems faster.

If you have any problems in using or connecting with Delphi, you may call Delphi at (800) 544-4005 or (617) 491-3393.

Now for some information for our Canadian readers who use DATAPAC. We here at THE RAINBOW were originally under the impression that the use of DATAPAC carried no extra charge. However, there is a $3 hourly surcharge for its use. We wish that we had been able to include this information in our November and December issues.

DATAPAC only supports seven-bit data transfer. Unfortunately, this means binary files (tokenized BASIC and machine language) cannot be transferred. This also makes several of the error-checking transfer protocols (XMODEM CRC, XMODEM check-sum, Kermit, etc.) inoperable. ASCII or source code listings can be transferred along with text files.

If you upload a BASIC program, please do it in ASCII format; if you upload a machine language file include the source code or a BASIC program to poke the code into memory. This enables all of our members to share the programs.

Speaking of uploading and downloading, we would like to thank several members and list the public domain software that they have recently uploaded.

Ken Denny (DENNCO) ***Banner Maker:*** This program prints banners on your printer with different size letters.

Kevin Davidson (KDAVIDSON) ***MYED Text Editor:*** A line-oriented text editor with over 20 functions. The documentation is included.

Bruce James (BRUCE1) ***Hires:*** A BASIC Hi-Res graphics program for use with the Radio Shack DMP-100 and Gorilla Banana printers. It allows you to save the picture in binary form to disk or tape.

Steve Bjork (6809ER) ***Coterm:*** A terminal program requiring 64K and a Deluxe RS-232 Pak. There are two versions available. *COTERM64/BIN* uses a 64-column software screen driver. *COTERM80/BIN* supports the PBJ *Word-Pak II*.

Allen H. Smith (LUTHER) ***Screen Utility:*** This program dumps your text screen to a line printer. There are assembled, source and BASIC poke versions.

Allen H. Smith (LUTHER) ***Key Klicker:*** Assembly language utility that produces an audible click every time a key is pressed. Both a source and assembled version are present.

Gordon LaPoint (GAL) ***Parallel Drivers:*** Assembled parallel port drivers for the December 1984 RAINBOW's "Cooking With CoCo" article.

Howard Dowda (BUGMAN) ***Astrology:*** Use this program to calculate natal charts, progressions, aspects and chart comparisons associated with astrology. Requires 32K Disk BASIC.

Dennis Derringer (PCF) ***Pager09:*** This BASIC09 program generates a paginated list of BASIC09 source files including printing the date, numbering the pages and indenting all logic structures.

Allen H. Smith (LUTHER) ***Ohm's Law:*** This OS-9 procedure performs basic Ohm's Law calculations.

Allen H. Smith (LUTHER) ***Boot Patch:*** This OS-9 Version 1.01.00 file should be made using the BUILD command. It will modify *CCDISK* to give 40 tracks and 12 ms drive step rate.

Dan Downard (DANDOWNARD) ***Crlf:*** This program adds a line feed after carriage return for non-standard printers.

Michael Kearney (WTVD) ***McPaint:*** This is an excellent graphics package similiar to *Graphicom* and *CoCo Max*.

Marty Goodman (MARTYGOODMAN) Newbox Series: This is Marty's continuing series of his thoughts on what Tandy should have included in the CoCo when it was first introduced and how it should have been packaged.

That's "Delphi Bureau" for January. Until next month, or even tonight on our new CoCo SIG, keep CoCo communicating.

(Rainbow technical assistant and CoCo SIGOP John Curl is also a military policeman in the Army National Guard. He has had his Color Computer since 1982. He and his wife, Becky, live in Louisville, Ky.)

WHEN QUALITY COUNTS

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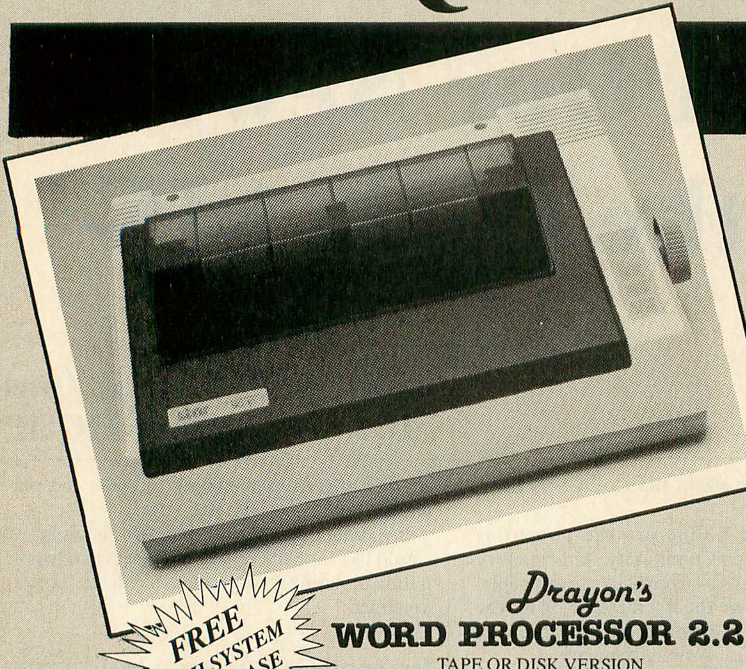

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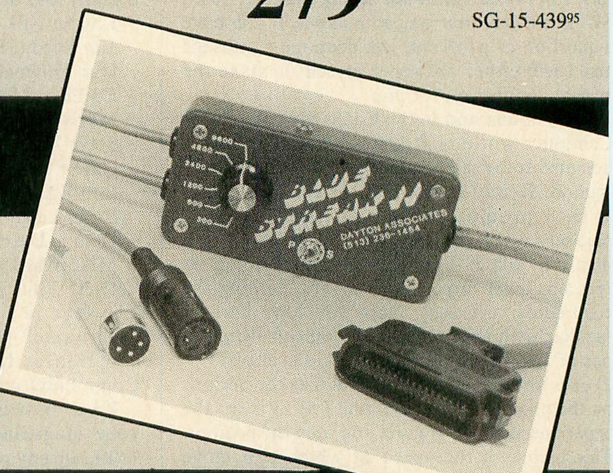

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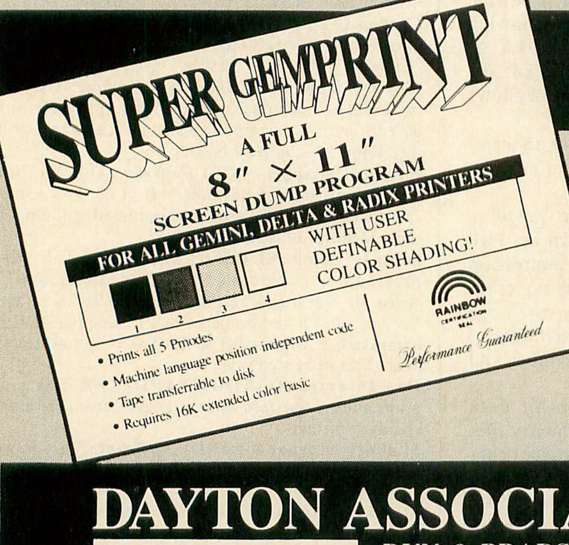

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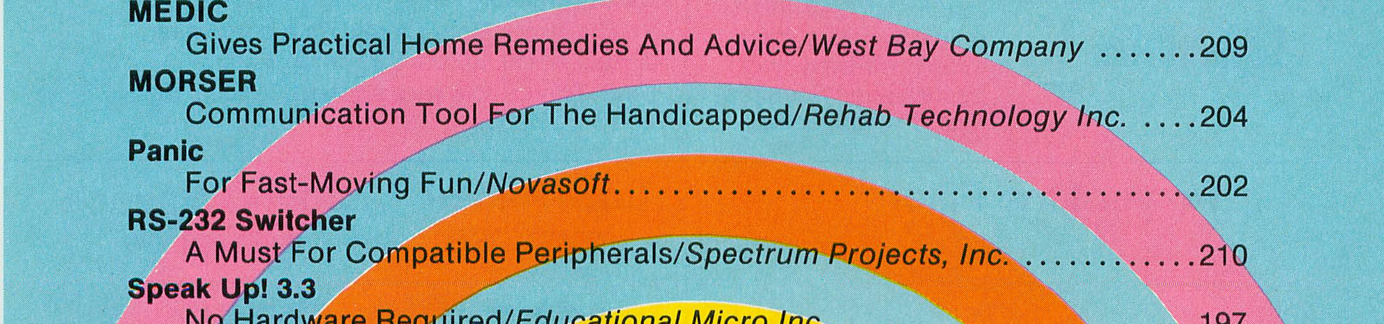

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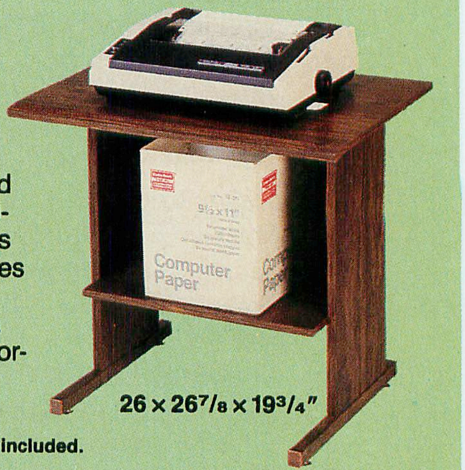

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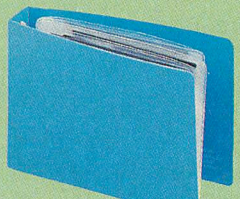

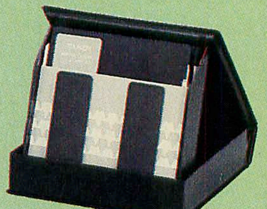

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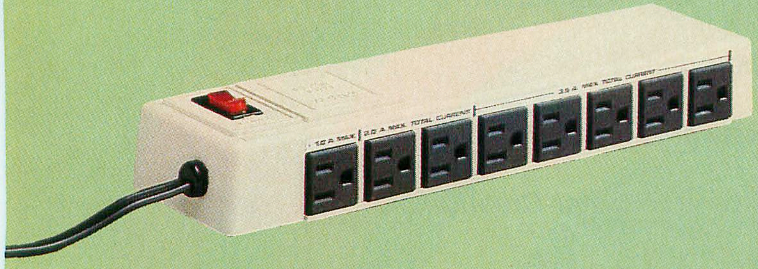

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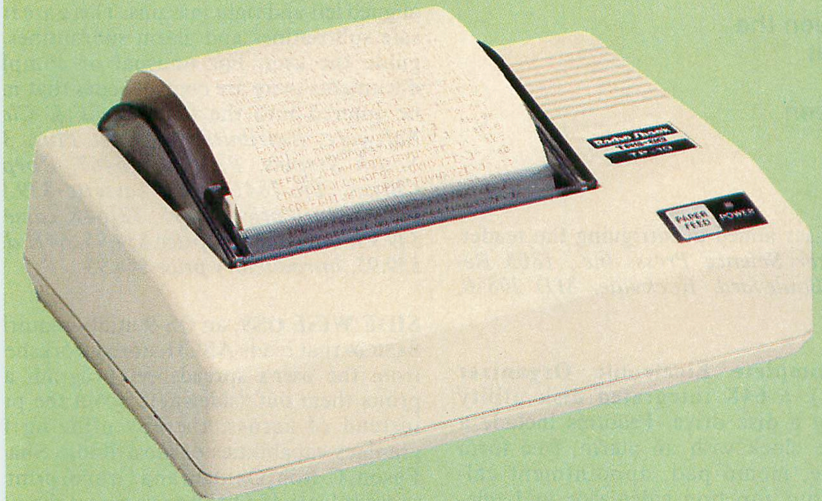

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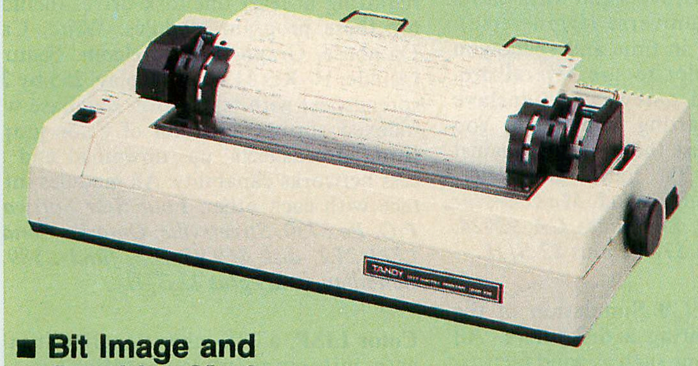

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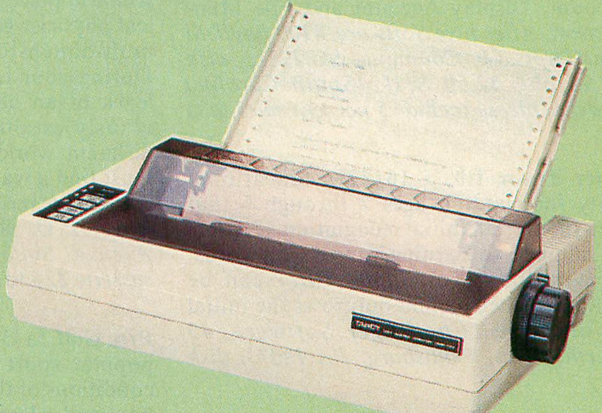

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RECEIVED & CERTIFIED

The following products recently have been received by THE RAINBOW, examined by our magazine staff and approved for the *Rainbow Seal of Certification*, your assurance that we have seen the product and have ascertained that it is what it purports to be.

This month the *Seal of Certification* has been issued to:

GRAFIX-3, 64K OS-9 graphics editor capable of accepting multiple commands, parameters passing, expanding or shrinking pictures, overlays and special switches that control screen response to joysticks. *Aardvark Software, P.O. Box 60183, Palo Alto, CA 94306, $20*

CAIS (Checking Account Information System), a 32K home financial utility requiring a disk drive that allows users to store and retrieve information for deposits, interest earned, checks written, ATM withdrawals, and other withdrawals or debits such as preauthorized payments and service charges. Among the primary options are: New Account, Post Account, Reconcile Account, Display Account and File Management. *After Five Software, 8100 Bayfield Road, Apt. 8-0, Columbia, SC 29223, disk $24.95 plus $2.50 S/H. (South Carolina residents please include 5 percent sales tax)*

Super Tutor 1.0, a 16/32K educational utility for children ages 2 through 6 that takes them from initial recognition of letters and numbers to learning how to spell words. The vocabulary of *Super Tutor* can be expanded when a child outgrows the initial list of words. *Challenger Software, 42 Fourth Street, Pennsburg, PA 18073, disk $24*

CoCo Max II, an enhancement package for disk users of *CoCo Max* that features multiple drive capability, 14 different character fonts, a special glyphic font, rotate function and a new edit pattern feature. The package is enhancements only for owners of disk *CoCo Max* and consists of a 16-page addendum to the original manual and the *CoCo Max II* disk. *Colorware Incorporated, 78-03A Jamaica Avenue, Woodhaven, NY 11421, enhancement package $20, entire new* CoCo Max II *package $79.95, plus $3 S/H*

Introduction to Computer Mathematics, a hard-bound book combining mathematics and computer programming by Russell Merris. Topics in algebra, geometry, probability and statistics are interwoven with step-by-step levels of computer programming skills. Realistic problems are presented in exercises aimed at intriguing the reader. *Computer Science Press, Inc., 1803 Research Boulevard, Rockville, MD 20850, $27.95*

The Complete Electronic Organizer (C.E.O.), a 64K integrated disk utility requiring a disk drive. Features include a real-time clock with an alarm, free form database, memo pad, appointment calendar, four function calculator and telephone number directory. *Computerware, P.O. Box 668, 4403 Manchester Avenue, Suite 102, Encinitas, CA 92024, disk $49.95 plus $2 S/H*

Omniverse, a 64K Adventure game. The scenario places you in the role of a theoretical physicist who discovers gateways into a multidimensional universe (Omniverse). During your forays in time and space you learn of an alien plot to use several previously established gateways to enslave different worlds, starting with Earth. You must find a way to use the gateways against the aliens and save the Earth. *Computerware, P.O. Box 668, 4403 Manchester Avenue, Suite 102, Encinitas, CA 92024, cassette $24.95, disk $27.95 plus $2 S/H*

Pro Golf, a 32K ECB Simulation of the popular sport requiring a disk drive. All conditions of the game such as wind factors, how and where a ball lies, angles to shoot and club choices are represented. Packaged on two disks, *Pro Golf* plays a total of 36 holes with practice sessions on the putting green and driving range. *Computerware, P.O. Box 668, 4403 Manchester Avenue, Suite 102, Encinitas, CA 92024, disks $49.95 plus $2 S/H*

Treasure of the Aztecs, a 64K Adventure game. You are placed in the role of a soldier in the army of Cortez searching for the treasure located somewhere in the jungle. Your party is ambushed and you awaken uninjured but separated from the group. Alone, you must face the perils of the rain forest, the threat of Aztec attack and the formidable mystery of a pyramid that may hold the greatest treasure on Earth. *Computerware, P.O. Box 668, 4403 Manchester Avenue, Suite 102, Encinitas, CA 92024, cassette $24.95, disk $27.95 plus $2 S/H*

16/32/64K Word Triad, two versions o
new word processing utility, one for 16K a
the other for 32/64K, featuring auto-pagi
auto-headers and footers (if desired) w
aligned left and right margins. There are f
safe subroutines and alarm subroutines
guide the user. For unusual or compl
documents there are control codes that m
be entered into the text. *Lewis & Cl
Software, distributed by Cost Plus, 3
South Staples, P.O. Box 6467, Corp
Christi, TX 78411, 16K cassette $39.
introductory price $24.95, 32/64K casse
$49.95, introductory price $34.95, 64K d
$59.95, introductory price $44.95*

SIDE WISE OS9, an OS-9 utility requiri
BASIC09 that reads ASCII-stored workshe
from the user's spreadsheet program a
prints them out "sideways" down the p
instead of across, thereby utilizing
graphics capabilities of most Radio Sha
Epson, C-Itoh, Okidata and Gemini print
to print from 48 to 189 rows across the p
at one time. This output can also be direc
to a disk file so it can be printed out a
background task. *Derringer Software, I
P.O. Box 5300, Florence, SC 29502-53
disk $39.95 plus $3 S/H*

PENPAL, a 64K integrated disk pack
requiring at least one disk drive. Includ
are these program modules: Write, Ca
Database, Graph-It and Telcom. Featu
include: Hi-Res 51 by 24 display, 255 by
spreadsheet with text editor, database w
indexed sorting, creation of color gra
from spreadsheets, up-/download and
cess networks capability. All modules int
face with each other. *Four Star Softwa
P.O. Box 730, Streetsville, Ontario, Cana
L2M 2L2, disk $69.95 U.S. funds, $89.
Canadian funds plus $2 S/H*

Color LISP, a 32K educational utility t
as a minimum implementation of L
allows users to become acquainted with
language used extensively in the field
artificial intelligence for symbolic mani
lation. Supported are graphics comman
recursion, machine language subrouti
integer numbers and long error messa
*Frost Byte, P.O. Box 169, Underhill,
05490-0169, cassette or disk $39.95 plus
S/H. (Vermont residents please ad
percent sales tax)*

PAYROL/BAS, a 64K financial util
requiring a disk drive and printer to k
payroll ledgers, cut checks (either pin-f
or friction-feed printers), automatic calcu
tion and retention of seven deductio
(including federal, FICA, state, three us
choice and one miscellaneous), calculat
of tax printed to screen before printout a
error collecting routine. *Howard Med
Computers, Box 2, Chicago, IL 60690, d
$79.95 plus $2 S/H*

onquering Armies, a 16/32K Adventure ame of medieval warfare that casts you in e role of Crown Prince and heir to the rone of Glasco. Your country is overhelmed by enemy forces that have slain the ing, and you, as the nation's leader, retreat the last stronghold of Glasco, the Abby f Avon. You must negotiate treaties with llied countries and find a way to reinforce our army and expel the invaders. *Mitchell oftware, P.O. Box 194, Tomahawk, WI 4487, 16K cassette $9.95, 32K disk $9.95 lus $1.50 S/H*

escue on Alpha II, a 32K Adventure game equiring a disk drive. Winner of the 1984 AINBOW Adventure contest, this game laces you in the role of Galactic secret agent harged with the duty to rescue Professor on Smartguy (inventor of the Biotron utation device) from the space wizard arkon before he uses the Biotron to make n army of invincible monsters. *Mitchell oftware, P.O. Box 194, Tomahawk, WI 4487, 32K disk $14.95 plus $1.50 S/H*

izard's Tower, a 16/32K Adventure game herein good King Zastor wills from his eathbed that any who can find and retrieve e three talismans of power, with which he led so justly, may inherit his vast empire. owever, Zastor, as an accomplished wizd, has made the quest for the Ring of trength, the Scepter of Speed and the rown of Wisdom difficult, thus insuring e finder will indeed be worthy of his ngdom. *Mitchell Software, P.O. Box 194, omahawk, WI 54487, 16K cassette $9.95, K disk $9.95 plus $1.50 S/H*

EEP-Trak Accounts Receivable, a 32K CB financial utility requiring a disk drive. his software will tie into the *KEEP-Trak eneral Ledger* and features: auto-interest lculation, auto-aging of accounts, installent sales, total due sales, negative amorzed sales, explanation space provided, tailed statements, account number checkg and credit limit checking. *The Other uy's Software, P.O. Box H, Sandy, UT 321, disk $39.95 plus $2.50 S/H*

hildpace, a 64K better-parenting program quiring a disk drive that offers a set of ientifically established developmental orms, an easy way to keep records of a ild's development and an early alert stem to spot potential problems. *Tandy orp., available in Radio Shack stores tionwide, disk $39.95*

eskMate, a 64K utility package for the oCo requiring a disk drive, modem, RS-2 Pak and Multi-Pak Interface (for the lecom). Features are a calendar, a text itor, index cards, paint, a ledger and a lecom application. Several subfunctions clude folder, printer, calculator, time, splay and cursor control. There are pop menus to guide the user through each plication. *Tandy Corp., available in adio Shack stores nationwide, $99.95*

Pegasus, and the Phantom Riders, a 64K arcade game requiring a disk drive, a joystick, mouse, and (optional) Multi-Pak Interface and/or Sound/Speech Cartridge for sound. Your mission is to aid the great Pegasus in destroying the Phantom Riders by repelling each successive wave of attackers from the mysterious Phantom Island. Perils include fire-breathing monsters and the treacherous waters of the lagoon. *Tandy Corp., available in Radio Shack stores nationwide, disk $24.95*

VARLOC, a 64K Adventure requiring a disk drive, joystick and (optional) Multi-Pak Interface and Speech/Sound Cartridge for sound. Match forces against Varloc, the evil wizard, and his legion of magical warriors. Playing on a game board of eight by eight squares, you must rely on your intellect, valor and every ounce of hocus-pocus you can muster to end Varloc's reign of terror. *Tandy Corp., available in Radio Shack stores nationwide, disk $24.95*

Menu Maker, a 32K machine language utility requiring a disk drive. Lets users add customized menus to nearly any diskette and, with a single keystroke, load any program from the menu. Compatible with Disk BASIC 1.0 and 1.1, this utility supports multiple drive systems. *Saguaro Software, P.O. Box 1864, Telluride, CO 81435, $24.95*

S.O.S. (Small Operating System), a 64K programming utility requiring a disk drive to drive the keyboard, screen, printer and disk drive(s). Included in the capabilities are: approximately 54,000 bytes of working space independent of ROM, 95 vectors to allow maximum use of routines and handling of mixed drives of 35, 40 or 80 tracks, single or double-sided. *Soistmann Enterprises, Inc., P.O. Box 257, Budd Lake, NJ 07828, or P.O. Box 330, West Berlin, NJ 08091, disk $49.95*

Triple RS-232 Switcher, a hardware accessory that allows CoCo owners to switch between any of three RS-232 peripherals such as modems, printers or digitizers without unplugging the RS-232 connectors at the back of the CoCo. *Spectrum Projects, Inc., P.O. Box 21272, Woodhaven, NY 11421, $39.95 plus $3 S/H*

PLANEGEO, a 32K ECB mathematical utility requiring a disk drive that is a collection of 10 operating programs and two control programs for the frequent, occasional or new user of plane geometric calculations during the course of work, school or recreation. Nine of the most frequently used geometric figures are covered. The program is self-sufficient and no user reference to text or tables is required. *TASC, 10619 Bayou Glen, Houston, TX 77042, disk $25*

PGCALPRT, a 32K ECB mathematical utility requiring a disk drive that is a collection of 10 operating programs and one control program for the purpose of providing a tool for the frequent user of plane geometric calculations during the course of work, school or leisure where a printed record of calculations is desirable. *TASC, 10619 Bayou Glen, Houston, TX 77042, disk $25, with* PLANEGEO, *$40*

TRY-O-TAX, a 16/32K home financial utility for the computation of federal income tax and providing assistance in the preparation of schedules A, B, C, D, E, F, G, SE and W; forms 1040, 2106 and 2441. *TRY-O-BYTE, 1008 Alton Circle, Florence, SC 29501, 16K cassette, 32K disk $15 plus $2 S/H*

The CoCo Greeting Card Designer, a 32K printer utility requiring a disk drive to create and print custom-designed greeting cards. Included are a library of pre-drawn graphics images such as a Christmas tree, birthday cake, turkey, gift box, etc., eight decorative borders and a selection of fonts and type styles, which are also open to custom modifications. Disk BASIC 1.0/1.1 or JDOS is required as is any 80-column printer. *Zebra Systems, Inc., 78-06 Jamaica Avenue, Woodhaven, NY 11421, disk $24.95 plus $3 S/H*

The *Seal of Certification* program is open to all manufacturers of products for the Tandy Color Computer, regardless of whether they advertise in THE RAINBOW.

By awarding a *Seal*, the magazine certifies the product does *exist* — that we have examined it and have a sample copy — but this *does not* constitute any guarantee of satisfaction. As soon as possible, these hardware or software items will be forwarded to THE RAINBOW's reviewers for evaluation.

— Monica Dorth

Barbarossa Provides Hours Of War Game Entertainment

At last, a game designer has used the CoCo's full 64K in a war game. *Barbarossa*, by Ark Royal Games, uses the memory to provide a high resolution map of Western Russia during World War II. The map displays various terrain types, cities and troop concentrations. The map extends to cover over two screens, with the CoCo playing the Soviet side well enough that by the time you advance the bulk of the German forces to the midway point, you begin to feel something of what the German commanders must have felt on viewing the Russian steppes.

An eight-page instruction booklet gets you up and running in short order and provides not just instructions, but two and a half pages of comments and playing hints. Pay attention to these as they improve your game strategy quickly to a level at which you almost feel able to drive the Soviets from their bastion cities in the East.

Control is through the keyboard using single keystrokes for input. I suggest that prior to play, a "crib sheet" be made up to remind the player of the various options. Also, after loading the game it helps to scroll up the map, making a hand copy as you go. This aids in planning force deployment both before and after an attack.

At the game's start Army Groups North and Central are well-placed for quick local victories, but Army Group South is weak, horrendously positioned and facing the toughe of the front line Soviet forces in a head-on attack. Th situation may be somewhat alleviated by forceful attacking with the North and Central Group forces, th transferring two or three Central Group units to Arn Group South. This should place the transferred units behir the Soviet defenders. While doing this, try shifting Arn Group South units to the flanks. This puts you in tl position to attack both flank and rear, thus improving tl combat effectiveness of your units.

Air power is provided by what, in effect, are three tactic air groups, assigned one each to the Army Groups. Tl attack strength of a given group or airflotte is allocated l the player to a given ground unit during an attack. Th means all air attacks are done in conjunction with a grour unit's attack. Airflottes lose attack strength with use, so th must be viewed as "ammunition;" once used up they a gone forever. Always ask yourself, "Is this target worth tl expenditure?"

Supply is the key to a successful advance in *Barbaross* At the start there is almost enough, and each "spring" son more trickles in, but to maintain an advance, cities and tl supplies they contain must be taken. Once momentum lost through reaching a negative supply situation it difficult to regain.

A game save option is set up to allow up to 10 differe game positions to be saved on a disk. The save feature needed, for while each turn is only 15 to 30 minutes, a fu game can last several hours.

As a fast-flowing game requiring both planning ar strategy, *Barbarossa* combines nice graphics with ease play to provide many hours of enjoyment. I recommend tl game to any armchair general who has the urge to take h (or her) CoCo to war.

(Ark Royal Games, P.O. Box 14806, Jacksonville, FL 32238, requires 64K, cassette $30.95, disk $33.95)

— Nevin J. Templ

One-Liner Contest Winner . . .

Pause Control demonstrates how to use the `EXEC 44539` command to pause a program.

The listing:

```
10 CLSRND(8):PRINT@165,"ENTER DE
C. NO.?  ";:LINEINPUTA$:PRINT@32
5,"HIT ANY KEY FOR NEXT #";:A=VA
L(A$):IFVAL(A$)>65535THENPRINT@2
32,"INVALID INPUT";:EXEC44539:GC
TO10ELSEPRINT@232,"HEX # IS:  "H
EX$(A);:EXEC44539:GOTO10
```

Jerry Stenger
Bellefontaine, OH

(For this winning one-liner contest entry, the author has been sent copie of both *The Second Rainbow Book Of Adventures* and its companion *The Second Rainbow Adventures Tape.*)

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Company Commander Has Expansion Capabilities

Ark Royal has produced some very enjoyable military mulations — their normal quality is too high for the icionado to call them war games! Their *Battle for Tunis* as innovative enough to be recommended as a model for udding programmers; their *CINC PAC-Battle of Midway* easily the best of its type I have ever played. Thus, *ompany Commander* was eagerly awaited, but was to be dged against some stiff standards.

The approach in *Company Commander* is unique in that is not a Simulation of a single historic battle, nor is it generalized game of an imaginary battle. Rather, it is a stem to which Ark Royal apparently intends to add uilding blocks. It allows one to fight the infantry and rmor tactics of late World War II on such diverse ttlefields as Tobruk, Stalingrad, Berlin, Aachen, Basgne and a half dozen others. You load the program and lect the battlefield on which you intend to fight. If you t beaten (or bored), you can escape to some other ttlefield and compound your losses there.

One common failing of war games for computers is a lack adequate instructional material. Sometimes that can duce a well-planned, militarily interesting game to udgery. Unfortunately, *Company Commander* falls into at trap. The instructions supplied are so disorganized and rgon-filled that I almost quit before I even started playing.

Once the player gets past the instructions and stumbles ound the screen for a turn or two, it becomes clear that e methodology and conventions are similar to most semiaphics military Simulation games on the market today.

There are, however, some nice touches. For example, agonal movement is allowed to both sides. (It is frequently lowed to only the computer, while the player struggles ith arrow keys.) The game plays faster than most of its pe; there are no "game save" features needed or supplied.

The lack of adequate instructions does bother the player en after he masters the moves, for the "Order of Battle" reen information uses abbreviations for which no glossary provided. I have over 25 years in the armed services and n a military historian to boot, yet even I got lost in some the jargon!

Company Commander is not as challenging as some her Ark Royal products, but it is unique in promising ture expansion capability by adding battlefields to the isting structure. If that becomes a reality, it could begin craze for this game much like *Dungeons and Dragons* did. your interests are in ground tactics of World War II and ter, this game may be a very worthwhile starting point, it be prepared to decode jargon and write your own struction book.

(Ark Royal Games, P.O. Box 14806, Jacksonville, FL 32238, requires 32K, tape or disk $29.95)

— H. Larry Elman

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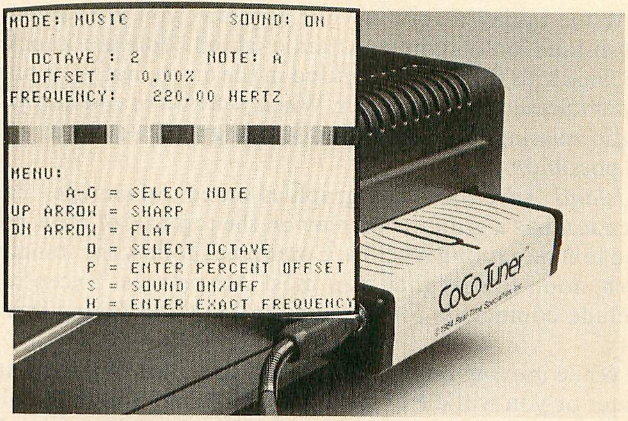

```
MODE: MUSIC              SOUND: ON

 OCTAVE :  2         NOTE: A
 OFFSET :   0.00%
FREQUENCY:    220.00 HERTZ

MENU:
       A-G = SELECT NOTE
UP ARROW = SHARP
DN ARROW = FLAT
         O = SELECT OCTAVE
         P = ENTER PERCENT OFFSET
         S = SOUND ON/OFF
         H = ENTER EXACT FREQUENCY
```

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While taking a spin in your airplane, you are forced to crash-land on a remote Atlantic island. You are knocked unconscious though not injured in the crash, but your plane is demolished beyond repair. When you awake you find your radio missing. You must find it to signal for help as soon as possible.

Island Adventure is a graphics-based Adventure. Each location has a graphics display on the top half of the screen and text describing it below. Commands follow the standard verb/noun format that is in most Adventures. Exceptions include commands for moving, looking and taking inventory.

While moving around the island, you must find food and water or you will die of starvation or thirst. You might also encounter hostile natives and other less-than-friendly situations, so be careful!

Island Adventure is a disk-based Adventure, so one drive is necessary to play it. For its low selling price, I definitely recommend buying the game. It will certainly give you a challenge.

(Stephen B. Boothby, 435 Dorset Commons #93, South Burlington, VT 05401, requires 32K, disk $11.95 plus $2 S/H)

— Andrew Dater

One-Liner Contest Winner . . .

These two one-liners generate temperature conversion tables; Listing 1 shows conversions from Fahrenheit to Celsius, while Listing 2 displays the opposite.

Listing 1:

```
0 PRINT"CELSIUS TO FAHRENHEIT":I
NPUT"BEGIN";B:INPUT"END";E:INPUT
"INTERVAL";I:PRINT#-2,"CELSIUS";
:PRINT#-2,TAB(10);:PRINT#-2,"FAH
RENHEIT":PRINT#-2:FOR C=B TO E S
TEP I:F=C*9/5+32:PRINT#-2,USING"
###.#";C;:PRINT#-2,TAB(12);:PRIN
T#-2,USING"###.#";F:NEXT
```

Listing 2:

```
0 PRINT"FAHRENHEIT TO CELSIUS":I
NPUT"BEGIN";B:INPUT"END";E:INPUT
"INTERVAL";I:PRINT#-2,"FAHRENHEI
T";:PRINT#-2,TAB(13);:PRINT#-2,"
CELSIUS":PRINT#-2:FOR F=B TO E S
TEP I:C=(F-32)*5/9:PRINT#-2,USIN
G"###.#";F;:PRINT#-2,TAB(12);:PR
INT#-2,USING"###.#";C:NEX
```

Dorothy Welch
Madison, MS

(For this winning one-liner contest entry, the author has been sent copies of both *The Second Rainbow Book Of Adventures* and its companion *The Second Rainbow Adventures Tape.*)

BASIC+ Makes CoCo Shine With Extra Features

BASIC+ is a nice utility for your 64K Extended CoC with at least one disk drive. It lets you enter the mo commonly used commands with a single keystroke. The include commands for disk or cassette operation such SAVE, LOAD, DIR, COPY, RUN, LIST, DEL, EDIT, RENUM, POK PRINT, PEEK and KILL.

BASIC+ provides a whole lot more, too! For instanc a 32-character, interrupt driven, type-ahead keyboa buffer including auto-key repeat and audible key clicks included. You can even type in your next command as yo disk, printer and programs are running. You can also co start your computer without powering off and back on. Th is a nice feature that is much easier on CoCo's componen Another feature I liked is the ability to scroll forward a backward through BASIC listings with the up- and dow arrow keys, plus you can enter the edit mode or delete line with a single keystroke.

The software supplied on disk requires only 1.25K RAM. It resides from &H7B01 to &H7FFF and is n position-independent, so you have to be sure not to lo anything on top of it. Running the program is as simple typing in RUN "BASIC+".

The built-in printer spooler uses the upper 32K of a 64 machine and is very impressive. While some delay expected in the I/O operations due to the inability of t CPU to do two things at once, I really didn't notice a l of difference. The instructions with the program state th printing at 9600 Baud results in about 93 percent norm speed. That appears to be about right as far I could te since there is hardly any slowdown in response time. It really neat to be able to work on a program while LLISTi it to the printer!

There is also a dual toggle command that uses the '*' k After pressing '*', whatever appears on the screen is se to the printer. It's very convenient because you can ke track of before and after modifications to your BASIC li listings while debugging a program.

The author (Dave Trapasso) did a nice job in laying o the function keys for *BASIC+*. For instance, all keys f similar functions are grouped together for LOAD, LOAD SAVE, SAVEM, CLOAD, CLOADM, CSAVE and CSAVEM. T function keys that correspond to these commands are located across the top of the keyboard in that same ord that is '!', '"', '#', '$', '%', '&', '"and '('. Similarly, LIST a LLIST use the '>' and '<' keys, respectively.

The 12 pages of instructions are clear, well-written a include a summary sheet of what each of the 23 functi keys do. The diskette is not copy protected, so back copies for your own use is no problem.

I liked *BASIC+*. It provides some really nice features t make your CoCo shine.

(Spectrum Projects, P.O. Box 21272, 93-15 86th Drive, Woodhaven, NY 11421, $29.95 plus $3 S/H)

— Jerry Semo

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- Un-DISK should be in the library of every serious CoCo user even if you own a disk says Frank J. Esser, independent reviewer for RAINBOW Magazine!

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Hi-Res+ Expands The BASIC Screen Format

BASIC's screen format of 32 by 16 characters can be very
onfining if you need to put a lot of text on the screen at
ne time. Here may be a solution to the problem: *Hi-Res+*
rom CMD Micro Computer Services Ltd. This utility
rogram gives up to 24 rows of characters with up to 85
eadable characters per row. In addition, it gives a split-text
creen and enhances the `INPUT` and error handling functions
f BASIC.

The copyright program comes on cassette only and
ncludes a 12-page manual. It requires a minimum of 16K
f RAM and either Extended or Disk BASIC. (However, the
rogram does not run with JDOS Disk BASIC.) There are
wo copies of the program (written in BASIC) on the cassette;
here is no copy protection. The manual recommends
aking backup copies onto either tape or disk and gives
etailed instructions on how to do it. The manual also
eminds you that all copies are for your own use only and
re not to be sold or given away. The software is sold "as
" and does not include any type of guarantee.

After you `CLOAD` and `RUN` *Hi-Res+*, a menu is presented
or various memory configurations: 16K, 32K and two 64K.
oth 64K options place the program in the upper 32K of
AM. The difference is in how memory is used for graphics
nd text. The program uses a `PMODE4` graphics screen with
our graphics pages for its text screen. The memory area
ormally used for text is used for storing variables used by
i-Res+. The first 64K option places the graphics screens
their normal locations in low RAM. The second 64K
ption reserves four graphics pages in upper RAM and
leases the normal graphics pages in low RAM for other
ses.

After the menu selection, the screen fills with a title block
nd a list of all characters available in the two character
zes is presented. An OK and blinking cursor appear at the
ottom of the screen. Any Extended or Disk BASIC program
an be loaded and run in its normal way, except for the
reen printing format and a few new or redefined instruc-
ons. The manual explains how to modify *Hi-Res+* to skip
e menu and title pages, as well as automatically set the
emory mode and auto-load another program.

The `SET` command is redefined to set the number of
aracters per line and can be one to 255. The `RESET`
ommand is redefined to set the number of lines, starting
the top, that will not scroll up or be cleared by a `CLS`
ommand or the `CLEAR` key. `PCLS` will clear the entire
reen. The range of `RESET` is zero to 22 lines and can be
anged from within a program. The lines stay protected
en when listing or editing. The original function of the
o commands is not needed because there are no block
aphics with *Hi-Res+*. The `PRINT@` command works as
efore except the print positions are different. The manual
plains how to calculate the print positions.

An ON ERROR command has been added that directs
our program to an area within the program in case of run-
me errors. The manual is a little sketchy on how to
plement this command. A command for entering string
riables has been added. INPUT= prints the current
ntents of a string variable and lets you edit it prior to entering it. The manual is a little sketchy on this one as well. An "auto-repeat" has been added to all keys.

Two character sizes are available, three pixel and four pixel wide. Upper- and lowercase alphabets are used as well as numbers and symbols. According to the manual, the four-pixel width works with less than 52 characters per row. More than 85 characters per row are not readable in any mode. Double-width characters are also available. Character-by-character underlining can be turned on and off. Foregrounds and backgrounds can be set to the same colors as those available in `PMODE4`. The BREAK key can be enabled and disabled. These various modes are selectable by printing control codes, such as `PRINT CHR$(14)`, to toggle the double-width mode.

Hi-Res+ loaded and copied (I erased the copy) with no problems. As mentioned before, there is no copy protection, however, it looks like the program is modified to prevent getting a complete listing of its contents.

I had to experiment with some test programs to get the ON ERROR and INPUT= to function properly. You can combine `PMODE4` graphics with some careful use of `PRINT@` to make charts and drawings with labels. The cover of the manual contains a screen dump (the dump routine is not included) of the on-screen title page as an example of mixing text and graphics. I found the print speed quite satisfactory. The auto-repeat function on all keys makes entering and editing programs easier.

Anyone writing programs that utilize the *Hi-Res+* features has to remember one thing: If you plan to sell, publish or give away copies of your program, you may not include *Hi-Res+* as part of it. Anyone using your program has to have their own copy of *Hi-Res+*. The author of *Hi-Res+* invites people who wish to market software that includes his program to write him.

(CMD Micro Computer Service Ltd., 10447-124 Street, Edmonton, Alberta, Canada T5N 1R7, distributed in the U.S. by Saguaro Software, P.O. Box 1864, Telluride, CO 81435, cassette $19.95 plus $2 S/H)

— Chuck Wozniak

About The One-Liner Contest . . .

THE RAINBOW's One-Liner Contest has now been expanded to include programs of either one or two lines. This means a new dimension and new opportunity for those who have "really neat" programs that simply just won't fit in one line.

Here are the guidelines: The program must work in Extended BASIC, have only one or two line numbers and be entirely self-contained — no loading other programs, no calling ROM routines, no poked-in machine language code. The program has to run when typed in directly (since that's how our readers will use it). Make sure your line, or lines, aren't packed so tightly that the program won't list completely. Finally, any instructions needed should be *very* short.

Send your entry (preferably on cassette) to:

THE RAINBOW One-Liner Contest
P.O. Box 385
Prospect, KY 40059

Make Labels The Easy Way With *Label Maker*

As a person who hasn't learned to say "no," I hold quite a few positions with the nonprofit organizations to which I belong. One of these positions is the newsletter editor for my classic car club. It is my responsibility every month to generate the newsletter, which details the coming month's activities, any birthdays or other special events and notices that are of interest or concern to the membership-at-large.

Thanks to *Telewriter*, and my Color Computer, the preparation of the newsletter is no big deal, but the addressing and mailing of it is a large pain in the posterior. Since many things are sent to a few members, I needed a way of duplicating mailing labels without typing. To my assistance comes a program appropriately called *Label Maker*. Released by CMD Micro Computer Services Ltd., *Label Maker* allows me to create and format labels in a manner much more convenient than using a word processor or, perish the thought, repetitive typing.

Label Maker is actually two programs. The first program, *Fontedit*, allows you to set up your printer. Since different printers have different capabilities and use different codes, *Fontedit* lets you create a printer driver for your particular printer. Since I have two printers, a DMP-100 dot-matrix and a daisy wheel, *Fontedit* allowed the use of both printers. Features supported and usable on dot-matrix printers are: condensed mode, elite, double width, italics, emphasis double strike and underline.

The program doesn't know the capabilities of the printer and in a lot of cases neither does the user, so *Label Maker* lets you test your printer's controls and capabilities with a test mode. In test mode, the printer prints out the font name turns on the font, prints out the font name again, turns of the font and prints out the name again in the norma manner. If things don't work properly, the wrong contro code has been used, or the printer does not have this particular capability.

The supplied printer defaults are suitable for doing standard 3.5 by 1-inch mailing labels or you can change to other size labels. The printer Baud rate is also changeable To create labels, simply type the information you wish to appear on the label. This data appears on the screen for you to play with before it is printed. Options at this time include text centering, editing and font changes. Once you have created your label, the data can be stored for re-use at a later date. *Label Maker* is a useful utility for those who have a need to produce a large quantity of identical labels.

One program change would make *Label Maker* mor practical — the inclusion of pre-made print drivers for th more popular printers. The program contains a printer fil for the Roland PR-1212 printer. While this may be a fin printer, I doubt if more than 10 readers have one. Th inclusion of printer drivers for Tandy DMP-100 compatibl printers and an Epson printer would save *Label Maker* user a great deal of effort.

Overall, I found *Label Maker* to be a very useful program After a bit of time is invested in setting up the printer driver you can rapidly produce a batch of identical, classy labels

(CMD Micro Computer Services Ltd., 10447-124 Street, Edmonton, Alberta, Canada T5N 1R7, distributed in U.S. by Saguaro Software, P.O. Box 1864, Telluride, CO 81435, $19.95 plus $2 S/H)

— Bruce Rotherm

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One-Liner Contest Winner . . .

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The listing:

```
1 CLS:LINEINPUT"FILE NAME?  ";F$
:M$="L6004GB":FORI=1TO3:CLS:PLAY
M$:PRINT@256+INT((32-((LEN(F$))+
10))/2),F$" SAVE #"I:CSAVEF$:CLS
:PLAYM$:PRINT@270,"GAP!":MOTORON
:FORJ=0TO1700:NEXT:MOTOROFF:CLS:
PLAYM$:PRINT@269,"NEXT!":FORK=0T
O800:NEXTK,I
```

William Grace
St. Joseph, MI

(For this winning one-liner contest entry, the author has been sent copies of both *The Second Rainbow Book Of Adventures* and its companion *The Second Rainbow Adventures Tape*.)

Speak Up! 3.3: Low-Priced With No Hardware Required

Speak Up! 3.3 is Educational Micro's newest software lease (no additional hardware needed) in a voice synthezer. I have heard several earlier *Speak Up!* versions and ust say I can't tell much difference in sound quality with e newest. However, maybe I'm being a little too picky nce I've heard the excellent quality of other synthesizers.

Speak Up! is just over 7K long and can be used on any 6K to 64K cassette- or disk-based CoCo. It is supplied on ssette with a special 16K version (different load addresses) n the one side, and the 32K/64K on the opposite. There as a problem with the 32K/64K program. It just didn't ant to operate properly after executing. Whatever was ogrammed to speak would not be heard. However, the 6K version worked as it was supposed to.

Before loading the program, you are instructed from the nall 13-page manual to `CLEAR` a certain amount of bytes epending on your CoCo's memory) before loading. After ecuting, you are in the direct input mode. You can type ything and hear it by pressing ENTER. Speech can also created through BASIC using an `EXEC` or `USR` statement d strings of text to be spoken. Voice pitch can be increased decreased by poking a location in memory with different mbers.

The sound quality of *Speak Up! 3.3* is poor compared some other voice synthesizers. In the documentation, it otes that *Speak Up!* is a great educational tool since ildren like to hear the computer talk. However, due to e poor pronunciation and scratchy sound of the speech, s very hard for a child to understand what CoCo is trying say. Imagine a TV speaker turned up with a station that's f the air. That same scratchy sound is similar to what *eak Up!* has in its background.

Speak Up! includes text to speech translation capabilities. does not, however, have a full set of phonemes to use — ly 37. I found it much harder to make words sound rrect with *Speak Up!* than with my SC-01-based synthezer.

Now that I've got the bad points out, let me tell you the od things. No hardware is required to use *Speak Up!*. This counts for the scratchy noise and low price of the ftware. It is nice to know CoCo can speak without ditional paraphernalia, but if you're interested in using eech with the CoCo for educational purposes, I recommend spending $50 more and purchasing a hardware-based ice synthesizer that is compatible with software on the arket.

(Educational Micro Inc., 1926 Hollywood Blvd., Suite A620, Hollywood, FL 33020, tape $29.95)

— Darren Nye

Insights Into Personal Computers Gives Perspective

In brief, this is a collection of articles describing some of ". . . the efforts involved in translating innovative technical ideas into personal [computer] systems for widespread individual use." Many of the articles are written by the engineers actually involved in planning and implementing the design of various personal computers, namely, the Hewlett-Packard 200 series, the Texas Instruments Professional Computer, the Digital Equipment Corporation personal computers, the Wang Professional Image Computer, the Data General Desktop series, the IBM PC*jr*, the Radio Shack Model 100, the Apple Lisa and the NEC Personal Computer. Intel engineers discuss the Intel 80286 processor (used in the IBM PC AT computer). There is a description of three disk operating systems, CP/M for Intel 8080/Zilor Z80 processors, MS-DOS for IBM PC-type computers, and UNIX, which is so large it requires a hard disk for storage and is usually used for multi-user systems. (None of these are as easy to use as Radio Shack Disk BASIC or JDOS, and neither CP/M nor MS-DOS is as capable as OS-9 in my opinion.)

There is a chapter containing some interesting software algorithms, an explanation of a piece of software called *TK!Solver*, a discussion on communications, another on venture capital and five interleaved chapters by the editors

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themselves. *Insights Into Personal Computers* contains so much material that this brief review cannot do justice to each topic. It is unclear toward what audience the book is directed.

Some chapters were written at the appropriate level for engineering-naive readers like myself. I enjoyed the description of the neat, elegantly simple design of the Model 100. The Hewlett-Packard 200 series based on the Motorola 68000 processor sounds very interesting and much simpler to use than their model 9100, to which I had access 12 years ago. The limitations deliberately built into the IBM PC*jr* lie just below the surface of the article on it and act as a warning to all manufacturers who heed that message. Other computers described in the book are/were also less than successful, as the reader will know, and almost every time because of a deliberate design of lack of access to hardware, firmware, basic software or essential technical information for purchasers or third parties. Other chapters are designed for the technically knowledgeable reader.

My strongest criticism is of the chapters done by the editors, which could have been written at a reasonably consistent technical level. The outdated information contained in the contributed chapters could have been placed into a more modern context.

On the contrary, often the editors' writing is more out of date than that of any of the contributors. For example, "[IBM] captured 14 percent of the market in 1981 itself." (Comment: What about 1982-1984?) On optical disks, "Several manufacturers including DEC, Toshiba, IBM, Thomson/CSF, Phillips and Sharp will be releasing such devices in the 1984-1985 time frame." (Comment: Where are they, and how did compact disk ROM technology ge omitted?) On graphics most of the discussion centers on software product for the IBM PC called *VCN ExecuVision* apparently released in 1983. (Comments: 1) Is this produc widely used and available?; 2) Many personal computer have graphics capability superior to that of the standar IBM PC.)

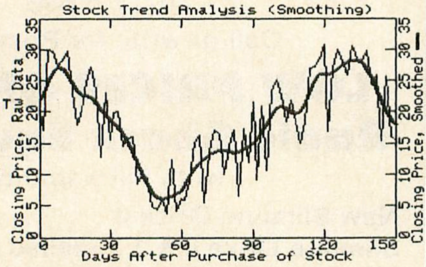
The first chapter and the epilogue are written at a leve for which perhaps no computing experience is necessary whereas the chapter on microprocessors left me somewha breathless. For example, "The Intel 8080 used n-channe enhancement-mode MOS, the Intel 8085 used n-channe depletion-mode MOS, the Fairchild 9440 used bipola technology and the Fairchild 16-bit processor uses I^2 technology." Whew! At the end of this chapter I did fin an unreferenced glossary that helped somewhat. Try thi entry: "Vector-based instructions. Powerful instruction that enable many sequential operations to be carried ou atomically." Does this mean assembler commands such a LDA +5,Y? There is a tremendous jump in assume technical knowledge from one chapter to another.

Apart from the IBM PC*jr* and the Radio Shack Mode 100, the personal computers described in the book are bot expensive and directed toward commercial business (excep for the Hewlett-Packard 200 series). In general, such system are of limited interest to the readers of THE RAINBOW. Mor importantly, I believe, the advances in computing techno ogy, both hardware and software, are driven by th ingenuity and creativity of the hobbyist and the home use not by "the business world," which tends to be both cautiou and conservative. As an example, the local university, wher I work has recently received bids for the installation of new mainframe computer to be used solely for education and research purposes. To this end, and to enhanc portability from microcomputers, the university require the availability of certain high level languages for th machine. A very important competitor replied that MODULA2, PROLOG and ADA were not available! Imagin if we had to wait for IBM to produce a micro (witho competition) or if only IBM was allowed to produc software.

These are some of the "insights" that *Insights Int Personal Computers* has overlooked. Looking through current copy of THE RAINBOW you can find articles an advertisments covering all the fulfilled technologic advances described in this book. A subscription to TH RAINBOW or to *Byte* and, in particular, the articles by To DiStefano and Steve Ciarcia, respectively, would entertai and instruct both the casual reader and an engineer just much as the purchase of this volume.

(The Institute of Electrical and Electronic Engineers, Inc., 345 East 47th Street, New York, NY 10017-2394, $29.50 plus $2 S/H)

— J.B. Garner, Ph.



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Create Custom Character Sets With *The Font Shop*

By John McCormick

Downline loadable fonts? What *are* downline loadable onts? If you bought an Okidata printer, you probably know hat a downline loadable character generator is the wonderful and frustrating item in the "bells and whistles" section of the printer manual that explains how to customize our printer.

When I bought my Okidata ML92 (almost entirely on the asis of a RAINBOW review) one of the features I thought 'd use the most was the option to load and use my own ustom-designed, 96-character/symbol character set. I uickly found that the programming of characters into my ML92 could become a lifetime occupation. Although Okidata's manual is clear and simple to follow, the process f designing new print character sets, 11 `CHR$` at a time for ach character (out of 96), was far too time-consuming to ttempt more than once. Now comes *The Font Shop*, and gain I am interested in using my Okidata to its fullest otential.

The Font Shop takes care of all of the tedious computational and programming aspects of creating a custom haracter set for the Okidata ML84, 92 and 93 printers. One f the characters the Okidata lacks that I constantly need , the copyright symbol. Although you may not need that articular symbol, probably everyone who has bought as ersatile a printer as one of the Okidata products has nough printing to do that he/she regularly feels the need f some special character that the regular Okidata set does ot provide.

Even if you just want to spice up your printing with ccasional italics, you can use *The Font Shop* because, in ddition to being an inexpensive, easy-to-use design utility hat produces an entire new set of characters, it provides hree included character sets ready to use or modify in articular or general. You can see just how the original Okidata character set looks by loading a *Font Shop* set dentical to the built-in version and, if you want, can modify his set to make it your own.

This program makes it easy to create your own individual attern to correspond to each of 96 ASCII codes, 23 hrough 127, or (for the ML84 ASCII) codes 32 through 5. Here is an example of one letter encoded to program he printer for a new pattern:

```
        LPRINT CHR$(27);"%A";
M";CHR$(28);CHR$(34);CHR$(8);
HR$(81);CHR$(4);CHR$(81);CHR$(4);
HR$(81);CHR$(8);CHR$(34);CHR$(28)
```

You must include information for 11 columns even if the olumn is blank. When writing a character set you really eed to write all 96 characters to overwrite whatever nformation is already in RAM. In addition, you have to esign the patterns and calculate a decimal equivalent value or the dots printed in each column. *The Font Shop* eliminates all of this, except actually designing the patterns, nd even that part of the job is made very simple.

Documentation

At first glance the documentation seemed a bit confusing, but after loading the program I found the operation was so obvious that the documentation was quite sufficient for anyone designing his or her own alphabets.

Operation

The disk version of the program only supports Drive 0, so load the editor from a disk in Drive 0 and execute. The screen shows a main menu with the option to load or save a file, use the character editing window or exit to a cold start in BASIC.

The only complaint I have about the program occurs here. You will probably want to load a working file into the editor so you can modify some characters or add some to a file you are building. To do this, you must know the name of the file, but unlike many programs requiring disk access, you cannot call a directory from the editor program; you have to exit to get a list of filenames and reload editor to load a character set. This is a small inconvenience, but it is the only thing I found that I didn't like.

Consulting your list of files (which you have written down) from the main menu, load the file you wish to edit (or start a completely new one), then select window. You are presented with a 7 high by 11 wide grid that contains the squares which are printed by the print head when you call for the letter (or code) displayed in the upper left corner of the screen. This pattern can be "played with" without modifying the stored pattern until you hit 'S' to save the particular character code in memory.

You can move to other code (letters) either one at a time by using next, or by typing `L` and giving the symbol you

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wish to work on. Almost immediately the new character is in the grid and the ASCII code for the character is also *displayed*

The Okidata actually has nine pins in a column, but the grid is only seven squares high; this is because the print head can only print seven dots vertically. The top two (ascenders) and bottom two (descenders) cannot both be used at the same time. Note that the top of a 't' is an ascender and the bottom (hook) of a 'y' is a descender. On the design grid you can choose either to draw with a descender or an ascender and change your mind at any time, so the program does support this nine-high arrangement just as the printer requires (that is, only seven at a time).

Another interesting feature is a one-letter command that reverses the letter. I haven't actually found any use for this feature yet, but it seems like a good idea.

One quirk of the Okidata print head is that it will not print two blocks side by side, but *The Font Shop* takes care of that: the editor simply erases one block if you put one where the printer won't accept it.

The program comes with three already coded character sets: Standard (the Okidata set), Italic and Graphics (various symbols instead of letters). One file of each is in the editor file form and a compiled form is also included.

The compiler is particularly important in generating character sets since it will automatically insert blank (or other) characters in your printer loadable file. This is crucial because if you already have a character set loaded in the printer, you need to write over the old file or be left with possible garbage in the new file. When your designs are complete, save the design file before loading the compiler (a good idea in any case since you may want to go back and modify it later). The compiler produces a program tha loads directly into the Okidata's memory. Every time th printer is turned off you lose the character set, so be sur to keep a copy.

Using the New Characters

Having the new character set loaded into the printe doesn't mean it will just use those characters in printing There is still the same old Okidata character set in use unti you call up the new set. This is a simple operation for an word processor that permits embeddable codes.

With my *VIP Writer* I define a print driver such as '5 to 5=27;50 and just use the embedded Code 5 whenever want to switch from the standard character set to th custom-designed set. To get back, I enter the code to cal up the data processing mode or the correspondence mode If you aren't using a word processor, just enter `PRINT#-2,CHR$(27);CHR$(50)` and the printer operates in the nev mode.

Conclusion

The Font Shop is a very easy-to-use utility that mos Okidata owners should consider if they have any use fo characters not in the standard set. The program uses doubl prompts where the wrong command can cost you work such as EXIT, and, although this sort of user friendlines should be included in every program, sadly it is not Therefore, I must make special note of this indication o the programmer's concern for the user.

(Atmospheres, 1207 8th Ave., Brooklyn, NY 11215, CIS: 73135,255; SOURCE: BCT173; specify ML84 or ML92-93, tape or disk $29.95 plus $3 S/H)

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Trigger 64 Makes Writing Combination Programs Easier

Trigger 64, by Master Creations, can be a very helpful utility, but be careful . . . it's not meant for everyone. *Trigger 64* is designed for a tape system, and it only works on the CoCo 2 with 64K. (It wouldn't work properly for some reason when I tried it on my silver CoCo.) It is made for people using the *EDTASM+* cartridge from Radio Shack: It sets up two 32K banks in memory — one for BASIC and one for the *EDTASM+* cartridge. It then allows you o switch between these two banks, making it easier to write BASIC/machine language combination programs.

To use *Trigger 64* from the *EDTASM* cartridge, type `Q` o return to BASIC, then load the program by typing `CLOADM:EXEC`. Once the program is loaded, holding the 'M' key and pressing the left-arrow key switches you between he BASIC and *EDTASM* modes. This allows you to easily create routines in the assembler, then compile them in nemory and use them from BASIC without saving the outines to tape first. Both creating and testing `USR` ubroutines is much easier this way.

Another helpful feature is that it allows you, by holding he hyphen key (-) and pressing the left-arrow key, to see he last page of text you typed in the other mode (without ctually entering that mode). An interesting side effect of his feature happens if you invoke it without the editor/ssembler cartridge. *Trigger 64* then shows the last page of ASIC you typed. (However, using M/left arrow locks up he computer if the cartridge is not inserted.)

Also, *Trigger 64* is fairly good at recovering from crashes. f the machine language routine you are working on crashes, ou can usually recover the *EDTASM* edit buffer by eloading *Trigger* and typing `EXEC 20514`.

The one page of instructions that comes with the program s adequate, but not terrific. I had no trouble loading the assette the program comes on. On a scale of 1-5 (1 = poor, = average, 5 = outstanding), I'd rate it as follows: price s. value, 2; documentation, 2; performance, 3; ease of use, ; and error handling, 4.

My one main gripe with the program is its price of $34.95. his seems a bit high for what it actually does. Still, if you se *EDTASM+* and have a 64K CoCo 2 with a tape system, ou'll find *Trigger 64* a handy utility.

(Master Creations, P.O. Box 2040, Pine Bluff, AR 71613, $34.95)

— Eric Tilenius

Hint . . .

To Hex with Decimal

To convert a hexadecimal number to decimal on an Extended BASIC machine, type `PRINT &Hxxxx`. To convert from decimal to Hex, type `PRINT HEX$(yy yyy`. Note that "xxxx" is a Hex number between 0000 and FFFF, and "yyyy" is a decimal number between zero and 65535.

Survive The Dangerous Drive In *Color Car Action*

Several months ago I bought an action program, *Bump and Jump*, for my Intellivision. It is a fast, fun and addicting game. Novasoft has created an excellent rendition of the *Bump and Jump* game, *Color Car Action*, for the CoCo. *Color Car Action* is easy to play. The object is to accumulate points by driving on a very dangerous road. Points are gained by staying alive and bumping cars off the road. Each type of car has a point value ranging from 200 to 500 points.

The road is divided into patterns of 20 to 60 screens. If you manage to complete a pattern without smashing any cars, 50,000 bonus points are awarded. The road is composed of over 500 screens. After completing 10 screens, there is a very short pause because the program generates 10 new screens. I did not find this pause annoying; it helped me keep track of my progress. The terrain graphics cover the four seasons, spring, summer, fall and winter.

Your car has the ability to jump cars and terrain. In order to initiate a jump the car must have a speed greater than 60 mph. The maximum speed of the car is 100 mph. If you are traveling faster than 60 mph and hit the joystick firebutton your car flies into the air. The distance the car flies is determined by your speed at the time the jump is initiated. Car speed is indicated at the top of the screen. When the car is moving fast enough to jump, a special message, JUMP OK, appears next to the speed meter. The car cannot be destroyed in the air, but watch out when you land. A diamond-shaped caution sign appears when you approach a terrain jump.

Each game is started with three cars and you are awarded an extra car for each 30,000 points accumulated. I'm not a very good wrist jockey, consequently, I did not reach 30,000 points and receive a bonus car. The five highest scores are displayed on the title screen. Names are entered using the joystick, and up to five letters are allowed.

Color Car Action comes on disk and is accompanied by two pages of instructions. The instructions are clearly written. I was operating the game in short order. Overall, the game has good graphics and color, and the sound effects are good. Just watch out for the dump trucks!

(Novasoft, 4285 Bradford N.E., Grand Rapids, MI 49506, 64K ECB, tape $19.95, disk $22.95)

— Gabriel Weaver

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Fast-Moving Fun With *Panic*

Meanies are approaching you from the left. Meanies are coming toward you from the right. All you have is a shovel. What are you going to do? Start digging and panic!

Panic, from Novasoft, is a Tom Mix arcade game offering good playability and a lower price than many arcade games. It is loosely similar to the various versions of *Lode Runner.* The object of the game is to dig holes and wait for a Meany to fall in, then bury him before he gets up. But watch out! They crawl back out "meaner" than before if you don't bury them fast enough.

`LOADM "PANIC"` auto-executes a title page flowing with activity. Credits for the author and publisher move around the perimeter while the demo continues in the center of the screen. The man in the demo quickly demonstrates the object of the game. As he buries the Meanies and they fall through the floor, they are transformed into the letters that eventually spell out the title. He concludes the demo by pushing the title off the screen. Amidst all this activity you can select one- or two-player action and the difficulty level (easy or hard).

Pressing the firebutton on the joystick ends yo selection, along with the title page, and play begins. At t top of the playing screen is the first player's score, the hi score and the second player's score. The player's numb flashes to indicate which player's turn it is. At the botto center of the screen is the number 2,000. To its right, t number of men remaining is indicated; to its left is yo current level of play. The rest of the playing screen consis of levels of floors connected with varying arrangements ladders. Little creatures, Meanies, move around the vario floor levels. They seem to have a sixth sense to seek out yo men, though sometimes you have to provide a strong "scent" for them to follow in order to lure them into yo trap.

All this time the number at the bottom of the scre steadily decreases, ticking down with clock-like accura The value of the number remaining after you eliminate the Meanies is added to your score as bonus points, addition to the points earned for each of the Meanies y kill. If you fail to eliminate all the Meanies by the time 2,0 has decremented to zero, you die and lose a man.

You kill Meanies by one of two possible method 1) digging a hole and burying the Meany when it falls i or 2) timing your digging and burying such that the Mea falls through the floor onto another Meany. You can d holes by using either the joystick or the keyboard (depres ing 'D' for dig), but the joystick is required for moveme of your men. The Meanies generally will come after you a fall into the hole, screaming mad. The hole must be fill before it crawls out by using the joystick or depressing t 'F' key (for fill), otherwise the Meany becomes much hard to kill.

When the Meany is buried it falls down to the next le and you get points for that accomplishment, provided it a "white" Meany. Blue and red Meanies have to be dropp through two and three holes in the floors exactly under ea other in order to be killed and earn higher point values. addition, if you choose the "hard" difficulty level, you mu also bury the blue and red Meanies on each floor as th fall through each level.

There are 10 different ladder arrangements and difficulty levels. The documentation, which adequate describes *Panic*, its characters, the instructions and even couple of useful hints, says anything after level 56 stays that level of difficulty. So far no one in our family, ev with three kids who seem to pick up on any game, has go past levels nine or 10. After clearing each level/screen Meanies, you automatically proceed to the next level. the end of the game, it prompts you to enter your name in the high score board (if you have the highest score to dat

Panic is relatively fast moving but, in the easy mode a first two screens, perhaps kids as young as preschool kindergarten could manage the game. My first-grader, aft a little difficulty, managed to finish the first screen wit few tries. My kids loved it! *Panic* can be enjoyed by ki of all ages. If you generally like arcade games, you proba will like *Panic*. It's a quality arcade game that is enjoya and a little easier on the pocketbook.

(Novasoft, 4285 Bradford N.E., Grand Rapids, MI 49506, 32K ECB, tape $14.95, disk $17.95)

— Kenneth D. Pet

The Coco Greeting Card Designer

The Coco Greeting Card Designer is the perfect program for the Holiday Season! You can Create and Print custom Greeting Cards to send to Friends and Relatives.
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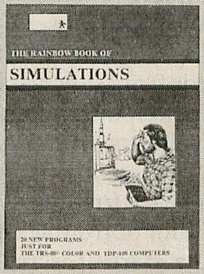

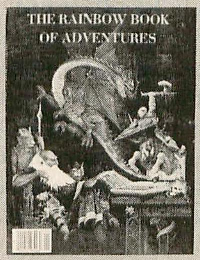

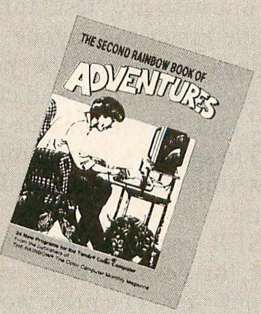

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MORSER: An Inexpensive Communication Device For The Handicapped

MORSER is designed for the severely handicapped, so I started out with my "test" for any program that purports to make life easier for anyone. (This test definitely doesn't make things easier for the programmer.) I opened the package and read only the ad copy, then inserted the ROM cartridge and turned on the computer. Using only the information on the screen, I initiated the program and was using it within 30 seconds. I like that kind of simplicity in a program!

MORSER converts the CoCo into a very limited word processor, or perhaps more correctly, an enhanced electronic typewriter. The price would be high for the scope of the program (it doesn't permit saving, loading or other word processor functions) if it weren't for one thing: You can write a letter using only one simple switch!

MORSER permits a handicapped user to write and edit documents using only a sip-switch or any other intermittent key connected to the joystick port of a CoCo. I tested MORSER using a joystick firebutton and the '@' key; both worked well for me, although the program's author warns in the documentation that cheaper joysticks and other switches may cause incorrect entries due to contact bounce (nothing to do with the program itself, but a fault of chea hardware).

Other devices that allow quadriplegics to write using simple switch are much more expensive, far out of the rang that many can afford.

Installation consists of inserting the ROM pack an connecting your choice of switch to the joystick connecto (Rehab Technology sells a breath-operated switch, ready t operate, for $50 and will supply a prewired connecto separately for $4 if you want to use another kind of switch)

When you power up, the screen shows a request to choos an input speed. This screen slowly cycles through the fou speeds from slow to fast, and the selection is made by closin the switch once when the speed you want is displayed. Yo then choose printer (yes/no) and printer column width an are presented with a screen showing only the cursor.

When I first tried the program, I chose slow speed an had a lot of trouble entering the correct letters, so I returne to the start-up screen (hold the switch closed about fiv seconds until the tone stops to return) and tried the medium-fast speed. I had almost no trouble at this speed. I worke right through the alphabet with only two mistakes on m first try, which showed that the program worked fine an the trouble at slow speed was just my too-rapid entry.

There are simple editing commands like Carriage Return Screen Print (dumps the screen to the printer), Clear Scree and Edit/Backspace (EB), which erases the character to th left of the cursor.

One of the best features is the cursor control (cursor up down, forward and back). These commands start the curso moving in a straight line and the cursor is stopped by momentary closing of the control switch. When the curso

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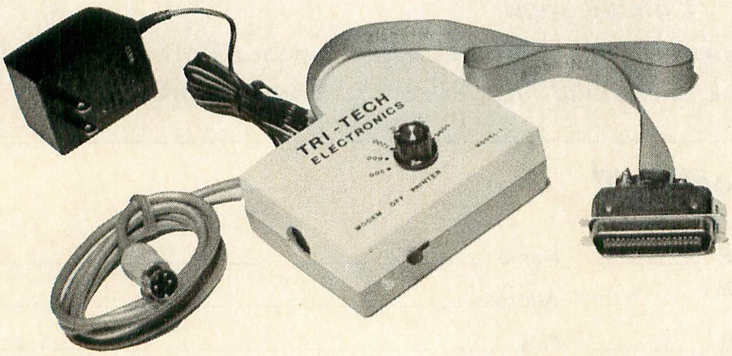

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eaches the edge of the screen it starts over again, making control of the cursor very easy for someone with limited physical motion.

The instructions are simple and clear, with hints on using Morse code and one page devoted to simple trouble-hooting. The documentation does not assume the user to be a computer expert. It can be installed and used by a beginner who purchases a CoCo and a printer for this one ob alone. The last two pages of the documentation have Morse code and all editing feature codes printed on one side only in large type. These pages can be placed at eye level or reference while learning the code.

The author says that by using MORSER a person can earn the code without trying. I found this to be true. After a little time referring to the charts and using MORSER, I ound that I was looking at the charts less and less. It is pecifically produced as a communication device for the disabled but, to my surprise, my wife thought it was ascinating and spent hours perfecting her timing and earning code. MORSER forces you to send "clean" code (evenly spaced characters) and you can see on the screen what you really sent.

MORSER was developed to provide an effective, nexpensive communicator for the handicapped, but I believe there might also be some market for it as a code practice unit, at least for clubs.

Since the author was attempting to produce a reliable device at as low a cost as possible, he did not include several hings I would like to see. I spoke with Mr. Dalhaus (the author of the program) and he said he is investigating the possibility of modifying the program to allow programming he computer with it, perhaps in a disk version. MORSER s currently only available in ROM pack because the argeted user normally requires the simplest system possible. Mr. Dalhaus said he is considering a disk version f he gets enough positive response.

The other thing I would like to see is a way to save what has been written. As it now operates, MORSER requires you to print out any information before the writing scrolls off the screen (this information is lost when off screen). The nformation (letter, notes, etc.) sent to the printer remains on the screen so several copies of a letter can be printed, each with a few portions altered. This feature is a great help, but I would still like to see a way to save what has been written.

This is the kind of product that shows us just how grown up the CoCo really is. Since the fall of microcomputer prices, serious applications can now be developed without he time, expense and expertise needed to produce a single-purpose device from scratch. This use of a multipurpose computer, even if only for the simple task of writing and nothing else, permits the production of an important device at a reasonable price.

In spite of its limitations, MORSER is still a major step forward in providing a simple, inexpensive communication ystem for the severely handicapped. Although I feel that adding a few features would be an improvement, in its present form MORSER is very usable and, compared to he other similar products, it is downright cheap!

(Rehab Technology Inc., 2815 Orchid Ct., Highland, IL 62249, $89.95 plus $5 S/H)

— John McCormick

Software Review

Do Some Fortune Telling With *Crystal*

Did you ever think it would be fun to have a fortune teller at a party gazing into a crystal ball telling your friends' fortunes? The description of *Crystal* led me to believe it was a program that would give that effect. The disk (or tape) comes with two programs. With the first you create a data file by answering questions about six people (no more, no less). This information is then used by the second program, *Crystal*, "the modern oracle."

You ask questions about someone or something following the format on the instruction pages. Here's where we thought the fun would begin, but although the documentation warned us that *Crystal*, "like any friend . . . may seem a little naive and confused . . . " we were not prepared for the typical responses! I typed, "Tell me about Chris," and after a long pause received as my reply, "Problems is the major problem for him. Conditions will improve."

After trying fruitlessly for more specifics, we shifted to another person and asked another suggested question, "What is Alfred's sign?" The answer was, "He is a(n) Capricorn. At 47 years of age he (has) have more to concern him than life." Only then did we realize that our family's names, with both an Alfred (14 and a Taurus) and a Fred (47 and a Capricorn), were too confusing for *Crystal*, so the data file had to be recreated, giving Fred a new name. This takes time; we thought we should have been warned initially that the names were too similar.

We continued our quest for entertainment with the new data file. The program responded properly to the names, but the replies continued to make little sense, yet were not sufficiently absurd to cause even mild laughter. For parties, more fun can be had with any newspaper's daily horoscope. If you take fortune telling seriously, responses like "Education is everybody's problem. Thanks to men." will probably annoy you as much as they did me.

(Prickly-Pear Software, 3640 N. Conestoga Ave., Tucson, AZ 85749, requires 32K, tape $24.95, disk $29.95)

— Carol Kueppers

Hint . . .

Saving in ASCII

Saving BASIC programs in ASCII (by adding an ",A" to the end of the command, such as `CSAVE"program",A`) is sometimes more reliable than saving in the usual "tokenized" format. This is especially true when you're transferring a program from one system to another. Another added advantage is that BASIC programs saved in ASCII can be edited using text editors such as *T/S EDIT, Telewriter-64* and *VIP Writer.*

The Challenge Of *Battle Stations* Is Fun For All

I always look forward to reviewing programs for RAINBOW. This month I received a real gem, *Battle Stations* from Novasoft. I played the game a couple of times before my wife took over. She played it a few times before her brother, then her sister and finally her father played it. By the end of the day the whole family and half of the neighborhood had a chance to beat the computer; some did and some didn't. If you like the game *Battleship*, where two players hide their ships and try to sink their opponent's, read on, because this is the game for you.

After loading the program and running it, you see the title screen accompanied by a theme song in four-part harmony. You should listen to the song play all the way through at least once because the CoCo sounds so good. If music is not your thing, then press the space bar. The song stops and you see an American flag. This is so you can adjust the colors and make sure that red is not blue. If the colors are reversed, which sometimes happens, all you have to do is press the space bar and instantly the blue turns to red. When this is taken care of, press ENTER and the game begins.

First, choose the level of play desired. In the Captain's Level, which is for the novice, you battle with a full complement of bombs each round. The Admiral's Level is for the experienced player who can handle his or her fire power being diminished as ships are eliminated.

After choosing your level, you position the fleet on a grid of squares. You have one aircraft carrier, battleship, cruiser and submarine, and two destroyers and P.T. boats. You can place the ships yourself or have the computer do it for you. I like this feature, but must admit it is still hard to hav an opponent do something for you. When the ships ar placed, you receive your ship's orders, which are: 1) To fire use the keyboard or joystick; 2) For shot advice from th computer, press 'A'; 3) Press control device to continue.

When the battle begins, the computer fires first. On th Captain's Level there are always eight bombs; on th Admiral's Level there is anywhere from one to eight bombs depending on how many ships you have. After the compute assault, it "learns" about its hits and "plans" its next attack When it is your turn, you move the cursor using arrow key or the joystick. (The arrow keys repeat, so you can mov fairly fast using the keyboard.) To fire, press the space ba or the firebutton, depending on what control device you ar using. After firing your bombs, hits turn the squares red an misses are blue. When either you or the computer finds an destroys all of the opposing ships, the game ends, the winne is announced and the music, in four-part harmony, plays It is a long tune if you win, but a short one if the compute wins. It is nice to have a little ego boost from an adversar

There are some special features in the program. If yo press 'A' on your first shot, the computer gives advice a to where to shoot. I tried this and found the computer no only took half of my bombs, but didn't give me very goo advice — I wasted a lot of shells. I like the idea, though You can also take back a shot by pressing the space bar i you have not moved from the space. You can quit a gam by pressing SHIFT 'Q'. There is also a demo game that play if you simply let the computer sit for a while.

I like *Battle Stations*. The graphics are great and th music is superb. If you purchase this game, have fun tryin to get to the computer without your family and friend trying to take the program so they can play, too.

(Novasoft, a Tom Mix Company, 4285 Bradford N.E., Grand Rapids, MI 49506, tape $21.95, disk $24.95)

— Thomas Nedreber

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oftware Review

Action And Adventure With *Ghana Bwana*

Do you enjoy action games with a bit of an adventurous wist? If yes, give *Ghana Bwana* a try. You will join Professor :hance, better known as "Ghana Bwana," on his hazardous uest for the Great Secret of the legendary Erebus Island. f your luck holds out, you can make it to the treasure site.

This game is Steve Bjork's (*Zaxxon*) latest creation. It equires a 64K CoCo with Color BASIC and one disk drive. \ Speech-Sound Pak can be added to make the game a little iore interesting. Either the keyboard or joystick can be sed for game play. I found the latter to be easier to use.

Ghana Bwana takes up one full disk. However, it is not opy protected and can be backed up with the `BACKUP` ommand. If you do a `DIR`, all you see is a loader program alled '*'. Simply `RUN"*"` to start. Your screen should turn lue, for the most part, after the graphics screen appears. f it's not, press Reset until it is. Pressing the ENTER key t this point takes you to an options screen. Here the umber of players, controller type and difficulty levels can e selected. When all set, just hit the joystick button or space ar to play.

There are a total of nine screens. I only got to the fourth.)n the first, Professor Chance is in a small boat (outrigger). t is up to you to steer the boat and pick up pieces of a map, vhich are represented as small square dots. For each piece f paper collected, a small map is drawn in the upper left orner. When enough pieces are found, the map is complete nd you go on to the next level. To my knowledge, the object s to pick up the map, score bonus points by collecting things uch as keys and bow and arrows, and get to the treasure n the final screen. Players must also avoid the obstacles, uch as enemies who fire at you, potholes, rolling rocks, harks and waterfalls. Each screen gets progressively more ifficult. To gain some hints and tips, it's a good idea to ead the small manual, which is written as a cartoon.

Ghana Bwana has an appealing look, but game play can e tedious. All the menus are formatted nicely, and there's scoreboard hall of fame that's updated and saved to disk vhen the game is over. I was content playing for about half n hour, but began to get disgusted when I kept having to tart over. If the time runs out or you get killed at a certain creen, you must start over on that screen and collect the ntire map again.

If you have a Y-cable or Multi-Pak and Radio Shack's ipeech-Sound Pak, you can add voice and a few more ounds to the game. However, the speech is hard to inderstand. I get better quality speech with my Voice-Pak ınd a text-to-speech program. There is not much added ound when using the Pak, but what's there does make it nore interesting and sounds neat. (It may be interesting to :now that this is the first arcade game Radio Shack is selling hat uses the Speech-Sound Pak.)

Ghana Bwana is a nice game, even though it can make ne feel frustrated after an hour or so. But don't fret, if 'ou're a good game player you can probably get farther and o faster than I did. Try it out at Radio Shack; it's worth he look.

(Radio Shack stores nationwide, 64K disk, $29.95)

— Darren Nye

Software Review

Undo The Letter Scramble In *ABC Puzzle*

ABC Puzzle, by Mikaron Software Company, is an old, yet simple game that has been transformed from a 3 by 3-inch plastic square containing 15 letters of the alphabet into a computer screen containing 15 letters. The game is played the same, but it gets a little rough if you try to carry it around in your pocket to play in your spare time.

The game begins with 15 squares inside a larger square frame. Each square contains a letter of the alphabet beginning with 'A'. However, they are slightly out of order. The sixteenth square in the frame is vacant, allowing the letters to be moved around one at a time until you manage to place them in order. The arrow keys place a marker over the letter you wish to move and the space bar moves it. A counter keeps track of the number of moves made. You are then graded based on the number of moves it takes to place all the letters in order.

ABC Puzzle is self-explanatory and requires no instruction manual. It requires a 64K CoCo with Extended BASIC and one disk drive. Try it out and see if you make the grade!

(Mikaron Software Company, P.O. Box 1064, Chester, CA 96020, disk $10)

— Larry Birkenfeld

One-Liner Contest Winner . . .

This one-liner draws a three-dimensional sine curve. The value RS, which you enter at the start of the program, determines the resolution of the picture; smaller numbers give higher resolutions, but take more time. With an RS value of 1, this program takes about 30 minutes to draw the picture.

The listing:

```
0 CLS:IFA=1THEN0ELSEINPUT"RS";M:
PMODE4,1:SCREEN1,1:POKE179,3:PCL
S:DEFFNU(V)=32*SIN(V/6):FORR=-11
0TO140:H=0:FORS=140TO-140STEP-M:
V=INT(80+FNU(SQR(R*R+S*S))-.707*
S):IFV<H THENNEXTS,R:ELSEH=V:IFV
>192THENNEXTS,R:A=1:GOTO0:ELSEPS
ET(110+R,192-V,0):NEXTS,R
```

Jorge Larios
Guadalajara, Mexico

(For this winning one-liner contest entry, the author has been sent copies of both *The Second Rainbow Book Of Adventures* and its companion *The Second Rainbow Adventures Tape.*)

Software Review

Tele-Addresser Features Unique Search Code

"At last a program for everyone and one program does it all" claims the promotional copy for *Tele-Addresser.* "Calendar appointment reminders, address labeling, household inventory, sports records, recipe collection, ham radio log . . . totally user friendly . . . with an easy-to-follow 130-page instructional aid." Unfortunately, I did not find this to be true.

Tele-Addresser is essentially a two- or three-up mailing list program that can also be configured to keep a personal address or account file, maintain an appointment reminder, track phone and sales calls and, in short, do the things small personal file programs normally do.

I make a lot of use of file managers in my profession — several different ones, in fact — to maintain class records, research notes, bibliographic data, my library of music and books, my church choir schedule, addresses and phone numbers, personal schedules and so on. I admit that judgments on applications software can be a subjective thing, but I have a hard time making a case for *Tele-Addresser*'s being "totally user friendly" or that it "does it all." It requires what seems to me to be a far more complex sequence of procedures than ought to be necessary.

The 113-plus pages of the spiral-bound booklet (not 130, as the promo material states) is one of the package's main drawbacks. It is redundant and disorganized, with an overuse of the passive tense and a general awkwardness o syntax that tends to obscure rather than illuminate th content. Moreover, following the "tutorial" entails constan jumping from one section to another. A clear explanatio of the program, followed by a step-by-step walk-throug using one of the sample files included on the disk woul be a more effective introduction to *Tele-Addresser.*

Past the tutorial and into the program, there are som logistical considerations worthy of comment. *Tele Addresser* consists of nine separate routines (as well as data file, DELETE, for killing files no longer needed accessed via the nine options (plus TERMINATE, an exit to-BASIC option) of the main menu. Therefore, frequen calls to the program disk are required, it must remai booted and data files must be kept on it along with th program routines. This may or may not be a problem; dat capacity is up to 27 files of up to 75 nine-field records each to a total of 1,000 records.

A second disk drive is a distinct convenience for som functions, such as sorting, which must be done before a fil can be listed or divided so as to enter records over it capacity. Sorting of individual files is possible with a singl drive, but you must first back up the data files resident o the disk you are using, then kill them on that disk to mak room using the DELETE — a procedure I found cumbersome. You must have two drives to sort, or "sequence," full disk's worth of 1,000 records.

Available print formats are also limited. Essentially, th data is arranged in either two or three columns in a sor of adaptation of that two- or three-up mailing label progra matrix. You may mask a field of a record from being printe by indenting it one space when it is entered. I would hav preferred the versatility of a full set of format options b menu and prompt, commonly provided in file manager such as this one.

The idea of user-applied mnemonic search code of up t five letters (initials plus group: i.e., LABTT = Lind Abernathy, Tennis Team) is clever and can certainly spee the entry and retrieval of data in certain circumstances Whether or not the ease thus gained compensates for th program's other shortcomings is an individual decision.

To sum it up, I could find nothing more in *Tele-Addresse* to recommend it over other programs with similar capabilities available for the CoCo.

(PKM Software, 1117 Denton St., Lakeland, FL 33803, minimum 32K Disk BASIC, $49.95 plus $2.50 S/H)

— John Ogasapia

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ardware Review

Printed Circuit Expansion Boards Give Complete Extensions And Connections

Three new printed circuit boards have been introduced y Real Computers and Intelligence of Santa Clara, Calif., hat enable the CoCo enthusiast to connect to the cartridge lot for purposes of expansion, prototyping and experienting.

The Bus Extender Board is 4.25 inches wide by 7.875 ches long. This board does exactly what it says — it simply xtends the cartridge slot connections to outside CoCo. The nd that plugs into the cartridge slot features gold-plated ontacts, however, the opposite end's contacts are nickellated. According to the data sheets received with each oard, all card edge contacts are supposed to be gold-plated.

One problem I saw with this particular board is that the nd away from the cartridge slot is not notched. This can resent a problem if, as an example, a 40-conductor ribbon able were to be attached. Even though it is simple to file otches to accommodate a connector, it would be nice if he manufacturer did it for us.

The two Prototype boards are gold-plated on both ends. he cartridge slot end on both is 40-pin (20 per side) with he standard 34-pin card edge connector on the other end. he first of these boards contains a 'P' pattern of 0.072-inch quare pads on a 3.5 by 6-inch double-sided board. This rovides 21 square inches of component layout area with oles on 0.1-inch centers.

The LSI Board features 5.8 inches of row patterns on a ouble-sided board. One row fits 600 mil I.C. packages; two ows fit 300 mil I.C. packages and one row contains a grid f holes as on the 'P' Board. The standard buss layout is sed to facilitate Vcc and ground connections. The overall attern is 3.625 inches by 6 inches, resulting in almost 22 quare inches of component layout space.

All of these boards are top-quality FR4 laminated glass poxy, and all holes are 0.042 inch plated through. All oards are received nicely packaged in individual plastic ags. Catalog numbers and cost of each board is as follows: C-8E.21/A, Extender Board, $14; CC-PP.22/A, 'P' Board, $20; CC-PL.23/A, LSI Board, $20.

These boards offer the hardware hacker a full complenent of extensions and connections for the CoCo 6809 nicroprocessor. If experimenting is your thing, then these oards might just fit your needs.

(Real Computers and Intelligence, P.O. Box 74, Santa Clara, CA 95050)

— Jerry Semones

See You AT
RAINBOWfest Palo Alto
Feb. 14-16, 1986

Software Review

Medic Gives Practical Home Remedies And Advice

Medic is a program for 8K-64K disk operation that provides medical counseling and information for the user. There is no documentation, as the program is menu driven and quite easy to use. Running *Medic* produces three title screens, followed by an instruction screen. The main menu is next, consisting of 13 "problem areas" from which to choose. Included among these are "common injuries," "ear, nose, throat," "digestive tract," etc.

Selection from the main menu yields a disclaimer message, which points out that all decisions are made by the user and suggests you consult your doctor if in doubt. This is followed by a screen that asks, "May I start asking questions about <problem area>?" Each time a main menu selection is made, the user must again view these two screens. I believe the disclaimer screen would be better grouped with the title screens at the beginning of the program, and the "May I?" screen eliminated.

Once a problem area has been selected (and permission has been granted), a submenu may appear relating to that subject. Selection of a more specific problem here yields a series of question screens. The user's answers to these questions determine one of two suggestions: see your doctor or use home treatment. If home treatment is applicable, *Medic* goes on to outline the suggested procedure.

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For example, if No. 4, "Ears, Nose, Throat," is selected from the main menu, followed by No. 3, "Ear pain or stuffiness," from the submenu, the question appears: "Is there more than mild ear discomfort?" A "yes" answer here responds with "See your doctor today," while a "no" answer responds with "Use home treatment." This suggestion follows: "A vaporizer gives humid air. Aspirin may relieve pain. Use antihistamines to reduce nasal secretions and shrink the mucous membranes. A drop of mineral oil in ear canal may ease inflammation. Do not put objects into ear. See the doctor if symptoms last more than two weeks."

After reading through the various home treatments suggested by *Medic*, my impression is that they are brief and, for the most part, common knowledge. I am an engineer with no formal medical training, but also a parent, so I have picked up some necessary skills along the way. Others may find all of the suggestions enlightening and valuable. *Medic* provides 115K of information on the disk — larger than RAM by virtue of several programs accessed as needed. The disk shows 14 granules (or almost 32K) free. I think this could be used to expand upon the text.

Another minor criticism involves program structure. To return to the main menu, the user is dumped back at the beginning of the program, and must view the three title screens and the instruction screen before regaining control to actually reach the menu. This process takes 25 seconds (it seems much longer), but could be avoided with a minor program revision.

Medic is an easy to use and generally well-designed program, which makes readily available a substantial amount of medical information. The package I received does not indicate the source of that information or the qualifications of the author. Due to the simple nature of the majority of the information, this may not be crucial to all potential buyers, but I'm sure some would be interested in these answers. Even with a full disk this program would not be a substitute for a comprehensive home medical book, but I believe *Medic* would benefit from an expansion to the available limits. It may well be quicker than leafing through a large volume from your shelf, and it is certainly another way to make use of your computer.

(West Bay Company, Rt. 1, Box 666, White Stone, VA 22578-9765, disk $20 postpaid)

— Stanley Townsend

Hint . . .

Single Disk COPY

Here's a feature that can be invaluable for users with a single disk drive. A single drive `COPY` can be performed by doing the following:

1) Insert the disk with the file to be copied into the drive.
2) Type `COPY"filename.ext"` and press ENTER.
3) After a few seconds you will hear a beep and the computer will tell you to insert the destination disk. Insert it, press ENTER and the file will be copied onto the other disk.

Hardware Review

RS-232 Switcher Is A Must For Compatible Peripherals

For those who are sick and tired of plugging and unplugging cables to connect your modem and then your printer, this gadget is just what you need. It eliminates that tangled mess of cables and is sure to save wear and tear on your CoCo's RS-232 connector.

The RS-232 Switcher consists of a nicely built rotary switch mounted in a small (3.25 by 4 by 2 inch) metal box. The box has rubber feet to protect furniture or whatever you choose to set it on. A large black knob on the front panel selects any one of three positions, which are numbered with black embossed tape. A cable with a Radio Shack-style 4-pin DIN male connector is routed out the rear of the box along with three other cables that are terminated in 4-pin DIN female inline sockets. Hookup is as simple as connecting the male plug to your CoCo RS-232 port, then your modem, your printer, and any other compatible device to the three inline female sockets.

It's really a goof-proof system and a must for the CoCo user who has a printer and a modem or any other RS-232 compatible peripheral. My only complaint is the price! I feel that $39.95 is too steep for the few parts that make up this gadget. If you're not capable or willing to build one yourself, you're doomed to the old economic principle of supply and demand because most similar devices advertised in THE RAINBOW are also in this price range. Oh well, that's the price of progress.

(Spectrum Projects, P.O. Box 21272, 93-15 86th Drive, Woodhaven, NY 11421, $39.95 plus $3 S/H)

— Jerry Semones

One-Liner Contest Winner . . .

Labeler will print up to five lines of text on standard mailing labels. If you enter an "@" at the beginning of the line, it won't be printed, but the rest of that line will be elongated. (The printer codes are set up for a Tandy DMP-110 printer.)

The listing:

```
1 E$=CHR$(27):FORL=1TO5:PRINT"LI
NE"L;:LINEINPUTA$(L):NEXT:INPUT"
# OF LABELS";N:FORP=1TON:FORL=1T
O5:IFLEFT$(A$(L),1)="@"THENA=LEN
(A$(L)):B$=RIGHT$(A$(L),A-1):PRI
NT#-2,E$;CHR$(14);B$;E$;CHR$(15)
:NEXT:PRINT#-2:NEXTELSEPRINT#-2,
A$(L):NEXT:PRINT#-2:NEXT
```

James A. Upperman
Amlin, OH

(For this winning one-liner contest entry, the author has been sent copies of both *The Second Rainbow Book Of Adventures* and its companion *The Second Rainbow Adventures Tape.*)

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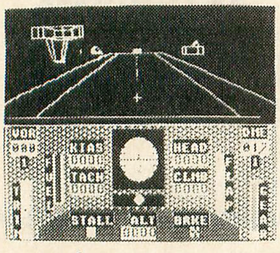
"World's of Flight is the best ou the-window simulation availabl for the CoCo". Dr. Scott L Norman, Hot CoCo, Dec. 198

Worlds of Flight (WOF) is a machine language, real-time flight simulation (of a sophisticated ultra-light aircraft). The progra is available on DISK but was specifically designed to bring unprecedented detail and power to CASSETTE systems. WO generates panoramic 3-D views of ground features as the pilot flies within one of nine different "worlds". Instrume flight capability has been provided along with some aerobatic performance. The simulation models over 35 differe aircraft and flight performance parameters including winds and cloud ceilings. Sound effects have been faithfull reproduced to provide an even greater sense of realism. A 25 page light manual explains the instrument panel, the basi of flight control, instrument navigation and even walks the pilot through a take off / landing sequence about the airpor Complete with charts bound in an attractive binder, the entire WOF package challenges you to find a more advanced flight simula tion for **any computer**. . . You simply can't! If you are a serious simulation buff this one is for you!

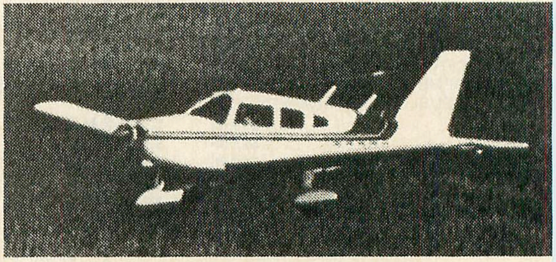


JOYSTICKS REQUIRED

32K MACHINE LANGUAGE

TAPE $29.95

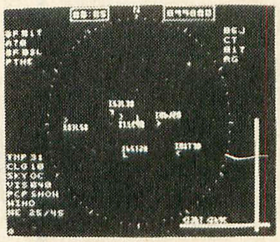
DISK $34.95



NEW!

APPROACH CONTROL SIMULATION

From Betasoft Systems



"Caught in a blinding snowstorm, two jet airliners are on a collisio course The pilots are completely unaware of the imminent danger. Hu dreds of lives are at stake. A high-speed disaster is inevitable unles you act fast. . ."

This and many other exciting scenarios await you as "Air Traffic Co troller" with the APPROACH CONTROL SIMULATION. The thrill challenges and frustrations you'll experience with this authentic, rea time simulation will lead to countless hours of discovery and adventur

★ ★ A Complete Simulation Package ★ ★

- **Software on Disk or Tape**
- **Quick Reference Guide**
- **Comprehensive Manu**
- **No Joysticks Require**

32K MACHINE LANGUAGE TAPE $29.95 DISK $34.95

TOM MIX SOFTWARE
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WE HAVE MORE SOFTWARE AVAILABLE THAN LISTED.
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THE SAILOR MAN

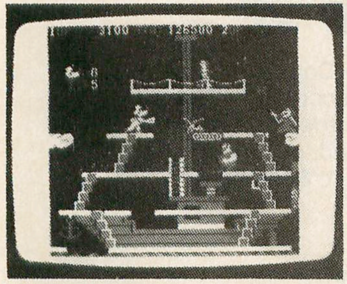
TAPE $29.95
DISK $34.95

GAMES

Requires 64K Machine Language

The first screen objective is to catch enough of Elsie's kisses (those Red Heart Shaped Things) to fill in the squares on the Sailorman's house. If you can time your punch just so, you can send the punching bag over to knock the bucket down and, with a little bit of luck, right on **Bigfatbadguy's** head. This will give you a little (but not much) time to catch all those RHSTs.

You must avoid contact with **Bigfatbadguy** who is actively pursuing you. You must also be careful of **Olduglyseawoman** who will appear at higher difficulty levels to chuck empties at you. Either avoid the flying bottles or punch them (with the fire button) to keep from being knocked into the water.

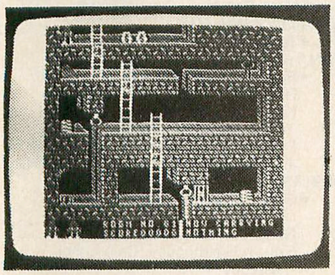


The second screen objective is to collect enough notes to play Elsie a little love song. You may jump off and onto the other end of **Fatguyeatinghamburger's** teetertotter to fly up a deck and even two decks if you manage to catch hold of **Smartaleckkid's** grab handles. Time it right and away you go.

The Third screen objective is to collect enough letters (thrown by Elsie's cries for H-E-L-P) to complete a ladder all the way to the crow's nest where Elsie is calling you. Beware of the Crow, however, who thinks you are after her eggs!

On all screens, eating a can of collard greens (labeled "S" for Collard and grasped by punching the can just right) will give you amazing speed, strength and ability and allow you to send **Bigfatbadguy** into the drink with a single punch.

DRAGON SLAYER



Save the villagers of Pendor! They live in fear of Icarus, the blood thirsty dragon. The dragon lives in a cave, way up in the mountains. The cave is a treasure chest, full of gems and cashbags. The trail to the cave is as menacing as Icarus himself. Outstanding graphics throughout. 160 screens of exciting action packed arcade excitement.

32K **Disk $29.95**

THE KING	**32K**	**Tape $26.95**	**Disk $29.95**		
SR-71	**32K**	**Tape 28.95**	**Disk $31.95**		
DRACONIAN	**32K**	**Tape $27.95**	**Disk $30.95**		
MS. MAZE	**32K**	**Tape $24.95**	**Disk $27.95**		
FROG	**16K**	**Tape $27.95**	**Disk $30.95**		
FANGMAN	**16K**	**Tape $24.95**	**Disk $27.95**		
KATER PILLAR II	**16K**	**Tape $24.95**	**Disk $27.95**		
WAREHOUSE MUTANTS	**16K.**	**Tape $24.95**	**$Disk $27.95**		

NEW UTILITIES

NOW! You can own the tools we've used to create "Donkey King", "Sailor Man", and others.

We are proud to announce our new utilities for the 64K Disk Color Computer, featuring.......

- **Full** use of 64K RAM • 100% Machine Language
- Parameters easily changeable in basic loader • No ROM calls
- "Cold start" exit to basic • Easy-to-read, informative documentation
- Keyklik • Selectable drive stepping rate
- Support 1-4 drives • Easy to use, with menu selected functions

To make life with your disks easier, may we suggest...

MAS — the finest assembler ever written for the Color Computer (includes EDT)............................. $74.95 Disk

EDT — effortless full (51×24) screen editing w/2 way cursor. Disk commands allow easy save/backup/append. Text files to 48K+. Copy, save, move, delete or print blocks. Much more....................................... $39.95 Disk

The Deputy Inspector — Alphabetize, re-sort, and backup directory; **fast** 3-swap backups, copy files or programs to same or other disks, can auto-reallocate granules during backup for **faster loading,** and more... $21.95 Disk

The Sector Inspector — Alphabetize, backup, and printout directory; repair crashes, LLIST basic programs, name disks, read in and edit 23+ grans, 3-swap backups, and more. Has 16-page manual and gran table print program.. $29.95 Disk

NEW EDUCATIONAL

FACTPACK

FACTPACK is a set of 3 programs designed for home or school use. The programs provide drill and practice with basic addition, subtraction, multiplication and division facts and are appropriate in grades 1-6. Each program requires a 32K Extended BASIC Color Computer. Disk drive and printer are optional.

Requires 32 K Ext. Basic **Tape $24.95** **Disk $29.95**

TEACHER'S DATABASE II

DISK ONLY
64K Req.

Teachers' Database (TDB) is a program designed to allow a teacher to keep a computerized file of information about his/her students.

The program requires a 64K Color Computer and at least one disk drive. This completely revised program includes all of the capabilities of the original TDB plus many new features.

- Information on as many as 100 students, or more, may be in the computer at one time.
- Each student may have as many as 20, or more, individual items of data in his/her record.
- The program has many easy to follow menus.
- Records may be easily changed, deleted, or combined.
- Information about students may be numerical or text.
- Records may be quickly alphabetized or reordered based on their contents.
- Records may be sored by various criteria.
- A full statistical analysis of scores may be done and sent to the printer.
- Student test scores may be weighted, averaged, changed to a percentage or changed to a letter grade.
- Individual student progress reports and class gradebook sheets may be printed.
- Three methods of data entry spped the task of typing in student grades and test results.
- The program may be easily customized to work with any printer.
- Student seating charts may be created and printed.
- Graphs of student test results may be created using the computer's high resolution graphic screen.
- Grade distribution can be displayed numerically or as a histogram.

64K TDBII $59.95 • 32K TDB Version - DISK $42.95 TAPE $39.95

VOCABULARY MANAGEMENT

Requires 16K Ext. Basic or 32K for printer output.

The Vocabulary Management System (VMS) is a series of programs designed to aid a parent or teacher in helping children to learn and practice using vocabulary and spelling words. The 11 programs that comprise the VMS include a full feature data entry/edit program, three printer output programs and 5 vocabulary/spelling game programs. The system's many outstanding features include:

- As many as 300 vocabulary words and definitions may be in the computer's memory at one time.
- Words and definitions may be saved on disk or tape.
- Remarks and/or comments can be saved with word files.
- A disk loading menu allows students to load disk files without typing file names.
- Word lists may be quickly alphabetized.
- The three printer segments allow you to create and print individualized tests, puzzles, word-searches and worksheets.
- The printer segments allow full use of your printer's special features.
- The 5 game programs are based on sound educational principles and provide practice in identifying words and matching them with their definitions in a fast-paced set of activities.

TAPE $39.95 **DISK $42.95**

FRACTIONS - A Three Program Package

MIXED & IMPROPER

1. Review converting mixed numerals and improper fractions.
2. Practice converting mixed numerals to improper fractions.
3. Practice converting improper fractions to mixed numerals.
4. Practice of both types. (Mixed to improper & improper to mixed)
5. Review converting mixed numerals to mixed numerals. (Used in regrouping in substraction).
6. Practice converting mixed numerals to mixed numerals.

EQUIVALENCE

1. Definitions of terms and review of finding equivalent fractions.
2. Practice finding equivalent fractions.
3. Practice finding sets of equivalent fractions.
4. Review of dinding if one fraction is equal to, not equal to, less than or greater than another.

LOWEST TERMS

1. Review of placing fractions into lowest terms by dinding the greatest comon factor (GCF) of the numerator and denominator.
2. Practice finding the GCF of pairs of numbers.
3. Practice placing fractions into lowest terms by finding the GCF of the numerator and denominator.

32K EXT BASIC **TAPE $30.95** **DISK $35.95**

MATH DUEL

MATH DUEL is a challenging mathematics game that pits you against the computer in a game of wits. You must use all of your knowledge of factors, multiples and prime numbers to develop a strategy that allows you tog ather more numbers and thus more points than the computer.

The game is deceptively simple. you select the size of the playing field that is composed of from 8 to 100 numbers. You must then choose numbers that will give you the maximum number of points and the computer the least number of points. There are only 6 rules.

32K EXT. BASIC **TAPE$24.95** **DISK $29.95**

RAINBOW

Give us your best: Join the ranks of these courageous CoCoists in showing the Color Computer world your high score at your favorite micro-diversion. We want to put your best effort on record in THE RAINBOW's "Scoreboard" column. All entries must be received 60 days prior to publication. Entries should be printed — legibly — and must include your *full* name, address, game title, company name and, of course, your high score. Each individual is limited to three score entries per month. Send your entries to Scoreboard, c/o THE RAINBOW.

★ Current Record Holder • Shutout

ANDRONE *(Radio Shack)*
54,300 ★Daphnie Phillips, Evansville, WI
ASTRO BLAST *(Mark Data)*
53,950 ★Bill Fritsch, Whitehall, PA
ATOM *(Radio Shack)*
54 ★Brent Heaton, Anderson, SC
53 Alan Drazen, Longwood, FL
BASEBALL *(Radio Shack)*
525-50 ★Bob Dewitt, Blue Island, IL
89-0 •Skipper Taday, East Lyme, CT
BATS AND BUGS (THE RAINBOW, 7/84)
24,600 ★Michael Rosenberg, Prestonburg, KY
3,000 Michael Scott, Johnstown, NY
2,500 Steven Bullard, Allen, OK
BEAM RIDER *(Spectral Associates)*
2,393,030 ★James Oakley, Nashville, TN
BLACKBEARD'S ISLAND *(NOVASOFT)*
79 ★Jeff Roberg, Winfield, KS
BLACKJAK (THE RAINBOW, 4/84)
$10,000 ★Wayne Dewitt, Blue Island, IL
BLACK SANCTUM *(Mark Data)*
106 ★Jeff Hillison, Blacksburg, VA
109 James Stakelin, Cynthiana, KY
BLOC HEAD *(Computerware)*
186,700 ★Pierre-Jean Douillard, Granby, Quebec
29,675 Jeff Ray, N. Charleston, SC
BREWMASTER *(NOVASOFT)*
279,600 ★Alan Drazen, Longwood, FL
216,350 Jean-Francois Morin, Loretteville, Quebec
166,175 Scott Purrone, Roselle Park, NJ
98,875 Chris Cope, Central, SC
78,100 Steve Leonard, Roselle Park, NJ
BROTAN THE BLUE (THE RAINBOW, 8/85)
1,384 ★Michael Scott, Johnstown, NY
822 Brian Voges, Jasper, IN
BUSTOUT *(Radio Shack)*
18,403 ★Chris Zepka, North Adams, MA
BUZZARD BAIT *(Tom Mix)*
4,455,150 ★Paul Rumrill, Gales Ferry, CT
3,091,700 Blossom Mayor, East Greenbush, NY
101,450 Jay Pribble, Davenport, IA
75,700 Paul Bullman, Rocky Mountain House, Alberta
55,450 Terry Pribble, Davenport, IA
CALIXTO ISLAND *(Mark Data)*
115 ★Glenn Della-Monica, Sacramento, CA
CANYON CLIMBER *(Radio Shack)*
9,129,100 ★Gary Mohnsen, Tucson, AZ
362,400 Chris Reynolds, Richmond, KY
330,400 Duane Sholter, Nipawin, Saskatchewan
286,800 Beverly Herbers, Placentia, CA
184,200 John Guptill, Columbia, MO
CASHMAN *(MichTron)*
$31,260 ★Fred Naumann, Hailey, ID
27,530 Sally Naumann, Hailey, ID
17,850 Matt Mendez, Baltimore, MD
CAVERN COPTER (THE RAINBOW, 2/84)
2,431 ★Jay Beam, Louisville, KY
CHUCKIE EGG *(A&F)*
418,250 ★Paul Hotz, Herzlia, Israel
CLOWNS & BALLOONS *(Radio Shack)*
352,020 ★Faye Keefer, Augusta, GA
45,460 Joyce Walcott, Mt. Clemens, MI
31,770 Cameron Walcott, Mt. Clemens, MI
30,190 Jason Smith, Ellijay, GA
30,070 Paul Walcott, Mt. Clemens, MI
COLOR BASEBALL *(Radio Shack)*
707-0 ★•Chislain Chillis, Trois-Rivieres, Quebec
549-0 •Skipper Taday, East Lyme, CT
243-0 •Steve Mutton, Shrewsbury, MA
147-1 Alton Updike, Deltona, FL
105-0 •Francis Yu, Calgary, Alberta
COLOR CAR *(NOVASOFT)*
525,650 ★Dan Bouges, Niantic, CT
COLORPEDE *(Intracolor)*
3,107,194 ★John Ray, Goodlettsville, TN
COLOR POKER (THE RAINBOW, 4/83)
1,168,900 ★Earl La Jesse Foster, Lynchburg, VA
COSMIC INVADERS *(Spectral Associates)*
16,400 ★Mariano Frausto, Blue Island, IL
CRASH *(Tom Mix)*
25,100 ★Jean-Francois Morin, Loretteville, Quebec
CRYSTLE CASTLES *(ThunderVision)*
850,156 ★Michael Brennan, Calgary, Alberta
800,060 Dan Mitenko, Calgary, Alberta
559,380 Jeff Dinger, Edgewood, MD
545,000 Jay Roberg, Winfield, KS
532,000 Eric Roberg, Winfield, KS
CU*BER *(Tom Mix)*
19,550 ★Rodney Mullineaux, Gig Harbor, WA
DALLAS QUEST *(Radio Shack)*
90 ★Roy Grant, Toledo, OH
91 John Semonin, Akron, OH
93 Tommy McClure, Doyline, LA
93 Robert Sunderland, Sacramento, CA
DEFENSE *(Spectral Associates)*
56,720 ★Brett DuPont, Oregon, OH
DEMOLITION DERBY *(Radio Shack)*
88,800 ★Skipper Taday, East Lyme, CT
43,500 Hillel Morris, Chicago, IL
43,100 Chris Fox, Midlothian, VA
37,000 Alexander Taday, East Lyme, CT
DEMON ATTACK *(Imagic)*
19,445 ★Erik Huffman, Rochester Hills, MI
10,830 Rupert Young, Sheffield, MA
DEMON II (THE RAINBOW, 3/85)
21,925 ★Keith Schuler, Merritt Island, FL
DESERT RIDER *(Radio Shack)*
32,488 ★Erik Huffman, Rochester Hills, MI
DEVIL ASSAULT *(Tom Mix)*
199,300 ★Pierre-Antoine Levesque, Sainte-Foy, Quebec
DOODLEBUG *(Computerware)*
1,685,350 ★Caroline Cyr, Ottawa, Ontario
1,457,290 Thomas Haythornthwaite, Ottawa, Ontario
825,370 Susan Ballinger, Uxbridge, Ontario
805,010 Bill Fritsch, Whitehall, PA
585,070 Johnny Fritsch, Whitehall, PA
DOUBLE BACK *(Radio Shack)*
1,618,400 ★Diane Guernon, Montreal, Quebec
614,450 Eugene Roosa, Stone Ridge, NY
450,600 Michael Brennan, Calgary, Alberta
8,970 Curtis Taylor, Scarborough, Ontario
DRACONIAN *(Tom Mix)*
628,470 ★Jeff Coladonato, Roslyn, PA
DRAGON FIRE *(Radio Shack)*
5,827 ★Susan Coker, Austell, GA
2,885 Stevie Hice, Newton, NC
1,520 Bette Hatcher, Norwalk, CA
DUNKEY-MUNKEY *(Intellectronics)*
66,900 ★Michael Drouin, Reeds Spring, MO
16,500 Baiju Shah, Deep River, Ontario
ELEC*TRON *(Tom Mix)*
40,650 ★Brad Gaucher, Hinton, Alberta
FALCON'S LAIR (THE RAINBOW, 8/85)
17,463 ★Michael Scott, Johnstown, NY
14,627 Alexander Taday, East Lyme, CT
12,497 Dick Teeter, Hawley, PA
8,430 Brian Voges, Jasper, IN
7,792 Steve Artmeier, Jasper, IN
FANGMAN *(Tom Mix)*
155,225 ★Daniel Thompson, St. Louis, MO
FOODWAR *(Arcade Animation)*
165,960 ★Chris Cope, Central, SC
FOOTBALL *(Radio Shack)*
266-0 ★•Tim Hart, Salt Lake City, UT
THE FROG *(Tom Mix)*
11,080 ★Mark Ferris, Deep River, Ontario
FROGGER *(Cornsoft)*
15,860 ★Erik Huffman, Rochester, MI
FURY *(MichTron)*
172,300 ★Daniel D'Amour, Pincourt, Quebec
GALACTIC ATTACK *(Radio Shack)*
30,870 ★Oren Bergman, Herzlia, Israel
GALAGON *(Spectral Associates)*
1,306,640 ★Jackie Maddox, Iron Station, NC
GHANA BWANA *(Radio Shack)*
218,420 ★Rupert Young, Sheffield, MA
146,930 Brian McGregor, Oshawa, Ontario
132,970 Karen Goddard, Oshawa, Ontario
128,430 Tom Gaynor, New Milford, CT
115,840 Price Wood Jr., Florence, SC
24,420 Jim Skamarakas, Gloucester City, NJ
GHOST GOBBLER *(Spectral Associates)*
76,900 ★Ghislain Chillis, Trois-Rivieres, Quebec
75,130 Greg Erickson, Lowell, MA
72,960 Sylvain Castonguay, Chicoutimi, Quebec
55,120 Jeff Weeks, Wetaskawin, Alberta
47,630 Alan Drazen, Longwood, FL
43,150 Myriam Ferland, Trois-Rivieres, Quebec
GLAXXONS *(Mark Data)*
19,146 ★Terry Moore, St. Catherines, Ontario
GOLD RUNNER *(NOVASOFT)*
373,850 ★Carmen Izzi Jr., Waterbury, CT
274,300 Andrew Reeves, Woodinville, WA
243,500 Chris Cope, Central, SC
222,450 James Bower, Tuckerton, NJ
211,950 Alexander Taday, East Lyme, CT
GUARDIAN *(Quasar Animations)*
4,350 ★Jason Forbes, Mexico, NY
ICEMASTER *(Arcade Animation)*
85,225 ★Pierre-Antoine Levesque, Sainte-Foy, Quebec
THE INTERPLANETARY FRUIT FLY (THE RAINBOW, 1/8
37,000 ★Scott Perkins, Port Orange, FL
22,000 Steven Bullard, Allen, OK
16,500 Michael Scott, Johnstown, NY
JUNIOR'S REVENGE *(Computerware)*
1,072,600 ★Matthew Ramsay, Detroit, MI
JUNKFOOD (THE RAINBOW, 11/84)
1,187,520 ★Larry Thomson, Menominee, MI
KAMAKAZIE KAR (THE RAINBOW, 8/85)
59.95 ★Matthew Schwenk, Catasauqua, PA
KATERPILLAR II *(Tom Mix)*
156,317 ★Uwe Steingens, Essen, West Germany
KEY BOMBER (THE RAINBOW, 8/84)
29,052 ★Tony Boring, Armagh, PA
KEYS OF THE WIZARD *(Spectral Associates)*
662 ★John Fulton, Boydton, VA
662 ★Ken Ostrer, Vancouver, WA
THE KING *(Tom Mix)*
1,670,900 ★Yolanda Farr, Sayre, PA
KING TUT *(Tom Mix)*
138,500 ★Martin Culver, San Francisco, CA
KLENDATHU *(Radio Shack)*
1,177,550 ★Dan Franzen, Westlake, OH
412,809 Jay Pribble, Davenport, IA
266,362 Brian Ennis, Wilmington, NC
KNOCK OUT *(Diecom Products)*
107,895 ★Bret Dennis, Delaware, OH
LANCER *(Spectral Associates)*
663,000 ★Jay Roberg, Winfield, KS
LASERWORM & FIREFLY (THE RAINBOW, 11/83)
38,380 ★Brian Voges, Jasper, IN
LEMANS *(Spectral Associates)*
0:70 ★Jeff Dinger, Edgewood, MD
LUNAR-ROVER PATROL *(Spectral Associates)*
136,700 ★Lori Day, Arlington, TX

SCOREBOARD

ADNESS & THE MINOTAUR *(Radio Shack)*
240 ★Chris Mitchell, Byron, GA
ARATHON (THE RAINBOW, 10/83)
307,790 ★James Sheedy III, Tonawanda, NY
AROONED! *(Saguaro)*
58 ★Mikel Rice, Panama City, FL
HE MARTIAN CRYPT *(NOVASOFT)*
31 ★John Allocca, Yonkers, NY
AZELAND *(Chromasette)*
21,060 ★Todd Knapp, Prairie du Chien, WI
EGA-BUG *(Radio Shack)*
10,661 ★Blain Jamieson, Kingston, Ontario
10,223 James Mancari, Ravenswood, WV
8,054 Jeremy Johnson, Nokomis, FL
7,930 Ron Haines, Nepean, Ontario
7,801 Jen Teeter, Hawley, PA
5,975 Curtis Taylor, Scarborough, Ontario
ICROBES *(Radio Shack)*
491,100 ★David & Alan Heckler, Hartselle, AL
ISSILE BARRAGE (THE RAINBOW, 8/83)
2-1 ★Joe Calcaterra, Ridgewood, NY
ONKEY KONG *(Med Systems)*
365 ★Mark Ferris, Deep River, Ontario
ONSTER MAZE *(Radio Shack)*
206,780 ★Wanda Jones, Brantford, Ontario
93,890 Rupert Young, Sheffield, MA
10,740 Scott Swedis, Spencer, MA
OON HOPPER *(Computerware)*
79,830 ★Daniel D'Amour, Pincourt, Quebec
OON SHUTTLE *(Datasoft)*
38,600 ★Jeff Weeks, Wetaskawin, Alberta
R. DIG *(Computerware)*
6,787,000 ★Jeff Roberg, Winfield, KS
UDPIES *(MichTron)*
981,700 ★Jon Blow, San Diego, CA
INJA WARRIOR *(Programmer's Guild)*
28,800 ★Dave Iverson, Oakville, Ontario
UMBER BUMPER (THE RAINBOW, 10/85)
416 ★Nedra Bishop, Jacksonville, FL
PERATION FREEDOM (THE RAINBOW, 8/85)
12,673 ★Alexander Taday, East Lyme, CT
10,926 David Brave, Bloomfield, CT
UTHOUSE *(MichTron)*
172,270 ★Matt Johnson, Eagle, PA
AC 'EM (THE RAINBOW, 1/84)
575 ★Greg Lewis, North Augusta, SC
AC-TAC *(Computerware)*
120,050 ★Matt Johnson, Eagle, PA
ENGUIN (THE RAINBOW, 2/85)
48,250 ★Paul Wagorn, Carp, Ontario
44,550 Kevin Gallagher, Santa Monica, CA
20,780 George Bodiroga, Eureka, CA
1,660 Robert Nicosia, Gloversville, NY
HANTOM SLAYER *(Med Systems)*
1,326 ★Susan Ballinger, Uxbridge, Ontario
NBALL *(Radio Shack)*
4,370,000 ★Christopher Ward, Burlington, IA
PELINE (THE RAINBOW, 6/83)
2,829 ★Mike Garozzo, Morrisville, PA
ANET INVASION *(Spectral Associates)*
155,000 ★Jimmy Doyle, Barrackville, WV
67,700 Alan Drazen, Longwood, FL
58,650 Ghislain Chillis, Trois-Rivieres, Quebec
39,350 Paul Hotz, Herzlia, Israel
17,800 Laura Hotz, Herzlia, Israel
LARIS *(Radio Shack)*
189,867 ★Andre Savoie, Marieville, Quebec
LTERGEIST *(Radio Shack)*
7,430 ★Myriam Ferland, Trois-Rivieres, Quebec
6,000 Billy Fairfull, Charleston, SC
OYAN *(Datasoft)*
3,785,000 ★Ben Collins, Clemson, SC
61,930 Erik Huffman, Rochester Hills, MI
PCORN *(Radio Shack)*
50,110 ★Nancy Ewart, Toms River, NJ
45,210 Mike Norris, Columbia, SC
20,730 Myriam Ferland, Trois-Rivieres, Quebec
OJECT NEBULA *(Radio Shack)*
2,750 ★Jeff Murphy, Lake City, GA
RAMID *(Radio Shack)*
220/112 ★Byll Adams, Pasadena, TX
220/112 ★George Fairfield, Victoria, British Columbia
220/112 ★David Oelhaupl, Calgary, Alberta
220/112 ★Robbie Sablotny, Mt. Zion, IL
Q-NERD (THE RAINBOW, 5/84)
1,958,950 ★Bruce Baltzer, Hanover, Ontario
QUIX *(Tom Mix)*
907,320 ★Andrew Norrie, Mississauga, Ontario
RACER (THE RAINBOW, 3/85)
174.9 ★Kirby Smith, York, PA
12.9 Robert Nicosia, Gloversville, NY
12.4 Michael Scott, Johnstown, NY
RADIO BALL *(Radio Shack)*
4,510,740 ★Les Dorn, Eau Claire, WI
1,301,350 Brian Matherne, Gretna, LA
REACTOIDS *(Radio Shack)*
5,257,295 ★Gary Bedford, Piqua, OH
RETURN OF THE JET-I *(ThunderVision)*
538,432 ★Matt Griffiths, Stilwell, KS
REVERSE (THE RAINBOW, 7/84)
7 ★Jon Hobson, Plainfield, WI
ROAD RACE (THE RAINBOW, 11/84)
91.7 ★Bill Martin, Myrtle Beach, SC
ROBOTRON *(Intracolor)*
467,000 ★Todd Hooge & Ian Dawson, Comox, British Columbia
335,400 Baiju Shah & Mark Ferris, Deep River, Ontario
ROBOTTACK *(Intracolor)*
463,650 ★Jay Pribble, Davenport, IA
299,350 Chris Zepka, North Adams, MA
36,090 Hiram Esparza, Blue Island, IL
RUN FOR YOUR LIFE (THE RAINBOW, 4/85)
80,000 ★Brian Jensen, Drayton Valley, Alberta
50,000 Karen Goddard, Oshawa, Ontario
20,000 Ryan Devlin, Louisville, KY
20,000 Brian Voges, Jasper, IN
SAILOR MAN *(Tom Mix)*
879,100 ★Alan Drazen, Longwood, FL
SANDS OF EGYPT *(Radio Shack)*
77 ★Jeff Hillison, Blacksburg, VA
80 John Allocca, Yonkers, NY
80 Bob Dewitt, Blue Island, IL
82 Jeff McKay, Travis AFB, CA
84 Greg Ross, Martinsville, NJ
86 Phill Zarfos, Dallastown, PA
SCARFMAN *(Cornsoft)*
545,700 ★Matthew Ramsay, Detroit, MI
SEA DRAGON *(Adventure International)*
76,110 ★Jean-Francois Morin, Loretteville, Quebec
SEASTALKER *(Infocom)*
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90/212 Jeff Hillison, Blacksburg, VA
SHAMUS *(Radio Shack)*
62,940 ★Jon Blow, San Diego, CA
SHENANIGANS *(Mark Data)*
90 ★Roy Grant, Toledo, OH
95 Jeff Hillison, Blacksburg, VA
95 David Kay, Winnipeg, Manitoba
SHOOTING GALLERY *(Radio Shack)*
227,840 ★Cliff Farmer, McGregor, TX
SHUTTER BUG (THE RAINBOW, 10/83)
3,861 ★Darren Griffin, Gloucester, Ontario
SIR EGGBERT JUMPER (THE RAINBOW, 8/85)
960 ★Jorge Polo, Muscle Shoals, AL
SKIING *(Radio Shack)*
1:00 ★Scott Clevenger, Fairmount, IN
1:00 ★Billy Fairfull, Charleston, SC
1:10 Kevin Gallagher, Santa Monica, CA
1:17 Michael Drouin, Reeds Spring, MO
SKRAMBLE *(Tom Mix)*
80,020 ★Brad Houlden, Kenora, Ontario
SLAY THE NERIUS *(Radio Shack)*
472,667 ★Jim Herbers, Placentia, CA

SNAKER (THE RAINBOW, 1/84)
1:23 ★Dan Sobczak, Mesa, AZ
1:24 Luanne Ashby, Phoenix, AZ
SOLO POKER *(Datasoft)*
1,100 ★Carol Staker, Moscow, ID
SPACE AMBUSH *(Computerware)*
29,480 ★Frank Canepa III, Santurce, Puerto Rico
SPACE ASSAULT *(Radio Shack)*
163,970 ★Jim Tucker, Commerce, TX
24,430 Michael Drouin, Reeds Spring, MO
19,065 Steven Allen, Sharpsburg, MD
SPACE RACE *(Spectral Associates)*
83,422 ★Mark Donahue, Alexandria, VA
SPACE WREK *(Spectral Associates)*
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SPEED RACER *(MichTron)*
139,210 ★Alan Drazen, Longwood, FL
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126,750 Jack Manzullo, Saginaw, MI
107,290 Oren Bergman, Herzlia, Israel
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STORM ARROWS *(Spectral Associates)*
285,850 ★Arnold Snitser, Los Angeles, CA
STRANDED *(Computer Island)*
70 ★Mikel Rice, Panama City, FL
TEMPLE OF ROM *(Radio Shack)*
959,400 ★Sonya Hurst, Richmond, CA
TIME BANDIT *(MichTron)*
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747,460 Steven Coladonato, Roslyn, PA
359,980 Kristopher Staller, Ft. Wayne, IN
215,810 Mark Olson, Whitecourt, Alberta
106,390 Sylvain Castonguay, Chicoutimi, Quebec
86,710 Bernie Moberly, Portage La Prairie, Manitoba
THE TOUCHSTONE *(Tom Mix)*
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TRAILIN' TAIL (THE RAINBOW, 8/83)
273,390 ★Jerry Dill, Grafton, MA
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296,700 ★Chris Reynolds, Richmond, KY
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— Debbie Hartley

SCOREBOARD POINTERS

In conjunction with THE RAINBOW's Scoreboard, we offer this column of pointers for our game-playing readers' benefit. If you have some interesting hints and tips, we encourage you to share them by sending them to the Scoreboard, c/o THE RAINBOW.

FEEDBACK

Scoreboard:

In response to Tony Boring's letter (September 1985) concerning *The Arconiax Assignment*, you have to get the crowbar, go to the richly decorated room, "go window" and "break window," and it will shatter into a million pieces. But, be sure you have the meat to give to the dog.

I also need help on *The Arconiax Assignment*. My friend and I have done almost everything right. We know that you need the stick to kill the moth, but how do you get the stick?

Gordon Rock
Davenport, IA

Scoreboard:

In conjunction with Jon Sowle's and Richard Russillo's letter (October 1985), there has been a 64K Olympic Decathlon game out for some time now. It is called *Decathlon* and is available through Spectral Associates.

Also, I would like to know how to open the steel door in the text Adventure *Aldaron*.

Rodney Mullineaux
Gig Harbor, WA

Scoreboard:

To answer Charles Farris' questions (November 1985) concerning *Shenanigans*, you get past the muggers by scaring them off with `OPEN KNIFE`. You get the knife from the package in the mailbox in the vestibule. `OPEN BOX 203` (your room number, found on your apartment door) to get the package. With `BUY BEER O'SHAUNASEE`, a new street to the south opens outside the bar. You *don't* get out of jail, but you don't go to jail unless you go outside naked! The window in the hall doesn't open.

Tom Austin
Atascadero, CA

BEDLAM BONANZA

Scoreboard:

Here are some pointers for those who have been trying to solve *Bedlam* and have almost ended up there in real life.

Go to the maintenance room and get the window hook. You will need it to get the red key from the medicine cabinet (don't forget the Blue Pill while you're there) and the green key.

To get the green key from the electroshock room without getting zapped, go to the entrance of the room but do not enter it. If you see Miss Lovely and her favorite couch, then you've gone too far. Use the window hook to get the green key. Once you get both keys, drop the window hook. Carrying it around will have others wondering if you do not really belong there.

Putting the Blue Pill into the hamburger that falls from the fridge and feeding it to the guard dog will sometimes work.

Jim Ayres
Philadelphia, PA

SHARE THE FLAGONS

Scoreboard:

If you are having problems wth *Lurkley Manor*, then you are reading the right letter. Simply go to the Flagon Room and get the blue flagon. Next, go to the Firing Range and let the shooter have a sip of your flagon. Then he says, "You will have to approve it with the mummy." Take it to the mummy, who is above the blue staircase to your left door. He will say, "Let rifle shooter have a sip of your blue flagon." Take it back to the shooter and, finally, let him drink it. The shooter promises never to shoot you.

Go back to the Flagon Room and get the orange flagon. Let the lady have a sip and she will tell you, "You must approve this with the skeleton first." Go to the staircases, take the orange staircase and go through the right door. The skeleton says, "Let the little old lady have a sip of your flagon." Then take it back to the lady and take her advice.

Jason M. Lindsey
Lake Jackson, TX

INFOCOM EXPANDS FOR THE COC

Scoreboard:

Hello to all fellow game lovers. The CoC
is making amazing progress in softwar
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Also, for all of you auto racing fan
Pitstop II by Epyx is out for the CoC
distributed by Radio Shack.

Erik Huffm
Rochester Hills,

SHOOTING STATUE

Scoreboard:

I have had a rotten time trying to sol
Raaka-Tu. I put the coin in the slot and t
statue turns. When I get near it, it shoots m
How do you get by it? Where are the g
goyles, the ring and the poisonous cand
Any answers would be greatly appreciate

Steve Nils
Seattle, W

Scoreboard:

In *Raaka-Tu*, the deadly candle is fou
on the south side of the Long Hallway.

In *Bedlam*, after you kill the dog, get t
dog and run south. I found that the guar
will capture you, but they don't take yo
green key. This key is needed to get out
the shed. If you still don't have the key, ty
`PLUGH`. You will end up back in your roo
This makes it a lot faster than reloading t
game.

If anybody has some helpful hints
Madness and the Minotaur, please write
can't obtain any of the spells.

In *Pyramid 2000*, I can't find the l
treasure.

Albert Krue
Long Beach,

I FOUND IT!

coreboard:

I was going to write and ask the same uestion many others have asked. Where is e poisonous candle in the game *Raaka-'u*? However, I am very proud to say that found it.

After the room with the statue in it, go E, , W. But, how do you kill the gargoyle once ou've gotten the candle? Also, get the lever, ut don't pull it.

Jeremy Hackworth
Rexburg, ID

CREMATING THE GARGOYLE

coreboard:

I have a tip for anyone having trouble illing the gargoyle in *Raaka-Tu*. First, you ust get the candle. It is located in the allway between the door to the vault and here the serpent's lair is. You'll also need e lamp, which is across from that hall in small room.

After obtaining these items, proceed to e small room just outside the gargoyle's oom and type `LIGHT CANDLE WITH LAMP`. o north twice and `THROW CANDLE AT ARGOYLE`, then go south and type `WAIT` bout seven or eight times. Go north and he ould be dead. `GET CANDLE` and type `XTINGUISH CANDLE`. There is a golden opstick in the north room.

Also, for anyone having trouble obtaining e fifth treasure, type `SEARCH ROOM` in the argoyle's chamber after killing him.

Does anyone know how to kill the wizard *Dungeons of Daggorath*. I can't incant the ouble ring and I've killed all the monsters xcept the wizard!

Todd Hooge
Comox, British Columbia

SACRIFICE THE FELINE

Scoreboard:

In the Adventure game *To Preserve Quandic*, to get past the mean dog you must `DROP CAT`. In the room with the mist in the center of the floor, you must `LOOK CENTER`. After you see the rope you must `SWING SWORD`, but make sure you read the light scroll before doing this.

If anybody knows how to get past the Worm Master, please write to the "Scoreboard."

Tim McCarty
Garberville, CA

READY FOR A SWIM!

Scoreboard:

I am having lots of trouble with several Adventure games.

In *Dallas Quest*, I can't figure out a way to hold onto the knapsack, the flashlight and the ladder at the same time when going into Chugalug's tunnel. I would also appreciate it if anyone who could tell me what objects are useless in this Adventure, so as not to have to cart them around.

In *Calixto Island*, I am permanently lost in the Pyramid. I can never find the way out and my light always goes out, killing me.

In *Sands of Egypt*, I can't even find the notorious swimming pool that everyone keeps talking about in the "Pointers" section.

Anyone who can help me with these problems, please write to the "Scoreboard."

Now for some help for you all.

In *Dungeons of Daggorath*, whenever attacking a powerful creature, such as a blob, knight or whatever, find an extra long passageway and wait at one end for the creature to get to you. Hit him three or four times and run like mad until you get to the other end. Turn around and wait for the creature to catch up, then do it all again. Always `SAVE` right before going down a level, and drop all gold rings.

Fred Turner
Laredo, TX

Scoreboard:

I am a novice Adventurer and so far have solved most Adventures appearing in THE RAINBOW. But, I can't figure out how to kill evil Zarkon in *Rescue on Alpha II.*

Mike Fregoe
Brasher Falls, NY

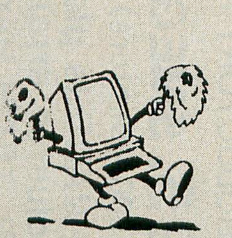
Scoreboard:

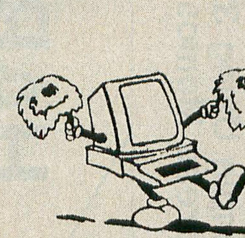
I need help on *Madness and the Minotaur.* I cannot figure out how to get any of the spells. When I get the spells, how do I use them? Also, all my attempts to make a map have proven useless. Any kind of help will be welcomed.

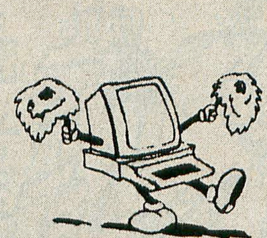
Ray Sutyla
Arborg, Manitoba

To respond to other readers' inquiries and requests for assistance, reply to "Scoreboard Pointers," c/o THE RAINBOW, P.O. Box 385, Prospect, KY 40059. We will immediately forward your letter to the original respondent and, just as importantly, we'll share your reply with all "Scoreboard" readers in an upcoming issue.

— Debbie Hartley







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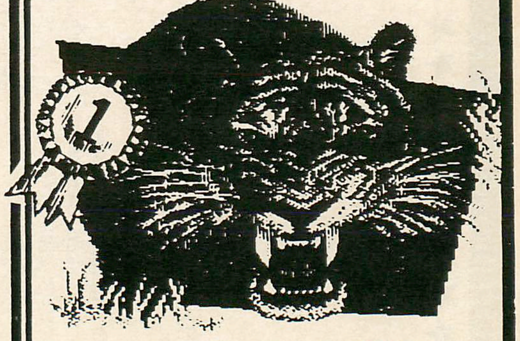

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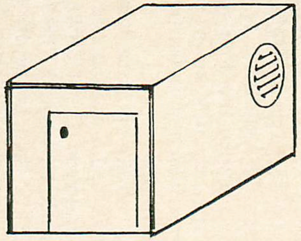

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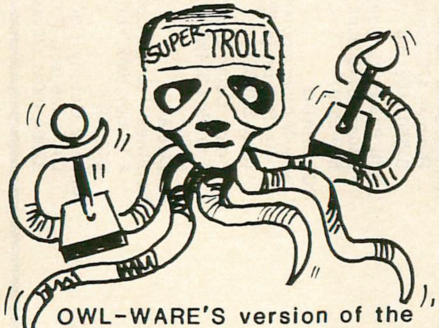

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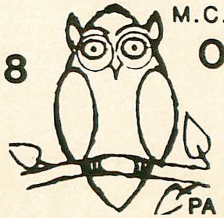

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CoCo Community

We have compiled a list of Color Computer Clubs because of the many requests we have received. CoCo Clubs may wish to exchange newsletters, share ideas for topics of discussion at monthly meetings, etc.

Please let us know if we have omitted any clubs and send us complete up-to-date addresses. Only those clubs that have signed our "agreement form" will appear in this listing of CoCo Clubs. Also, please notify us if you wish to add or delete any names on this list. Send your information to:

CoCo Clubs
THE RAINBOW
The Falsoft Building
P.O. Box 385
Prospect, KY 40059

ALABAMA

Birmingham Alabama Color Computer Club, Robert Matthews, 3529 Laurel View Lane, Birmingham, 35216, (205) 933-0887

Huntsville Color-80 Users Group, Jerry Crawford, 15001 Glory Dr., Huntsville, 35803; (205) 881-9698

ALASKA

Alaska Color Computer Users' Group, Rick McDannel, 430C Beluga Ave., Ft. Richardson, 99505, (907) 428-0392

ARIZONA

Huachuca Hot Pokers, James Standley, 235-A Jeffords Street (NBU-96H), Ft. Huachuca, 85613, (602) 458-8338

Tucson Color Computer Club, Marshall R. Madole, 3721 S. Le Beaux Place, Tucson, 85730

ARKANSAS

Central Arkansas CoCo Club, Melinda Braslovsky, 1203 Erving Rdg., LP Cabot, 72023, (501) 982-8854

CALIFORNIA

Color America Users Group, Mark Randall, 2227 Canyon Rd., Arcadia, 91006, (213) 355-6111

Los Angeles-Wilshire Color Computer Users' Group, Norm Wolfe, P.O. Box 11151, Beverly Hills, 90213

The Davis CoCoNuts, Adam Sherman, 1818 Haussler Dr., Davis, 95616, (916) 758-3195

Sacramento Color Computer Club, Wayne Chrisope, P.O. Box 9, Elverta, 95626

North American CoCo - Orange County, Eric Wilson, 8405 Sweetwater Circle, Huntington Beach, 92646, BBS (714) 847-2268

Joe Bennett, 1169 Florida Street, Imperial Beach, 92023, (474-6213)

CoCoholics and Tandy Computer Club, Kenneth M. Denny, 801 W. Roseburg Ave., Suite 200, Modesto, 95350, (209) 523-5176

California Computer Federation, Jim Sutemeier, 9565 Reseda Blvd., #324, Northridge, 91324, (818) 993-5217

Ventura County Color Computer Club (VC4), John Bascue, Oxnard Public Library, 214 "C" Street, Oxnard, 93030, (805) 987-4752 or DATA (805) 484-5491

Sacramento CoCo Club, Charles Doughty, Box 60511, Sacramento, 95860

Salinas Color Computer Club, Larry Livingston, 501 Monterey Highway, Salinas, 93908, (408) 484-9697

Citrus Color Computer Club, Joseph Kohn, P.O. Box 6991, San Bernadino, 92412, (714) 792-8721

The MC-10 Newsletter Club, Jose J. Bray, 4730 Cass Street, San Diego, 92109, (619) 483-8744

Local Color—A CoCo Club of San Francisco, Andrew G. Kieval, P.O. Box 421242, San Francisco, 94142

San Joaquin CoCo Club, Steven Paul Moreno, P.O. Box 99024, Stockton, 95209, (209) 951-3938

Silicon Valley Color Computer Club, Shawn Jipp, P.O. Box 61593, Sunnyvale, 94088, (408) 749-1947

CoCo Nutz Computer Club, Walter V. Seay, 68-461 Highway 86, Thermal, 92274, (619) 397-4252

Conejo Color Computer Users Group, Robert S. Rimmer, 472 Sundance Street, Thousand Oaks, 91360, (805) 492-4972

South Bay Color Computer Club, Karen Schlotzhauer, 23113 Dana Ave., Torrance, 90501, (213) 539-2539

COLORADO

Lowry Microcomputer Club/CoCo Users' Group, Jerry D. Surritte, 2249 Moline St., Aurora, 80010, (303) 343-3273

Colorado Color Computer Club, Joe Applegate, P.O. Box 33492, Northglenn, 80233, (303) 650-9768

FLORIDA

Northwest Florida CoCo Nuts, William N. Lamb, P.O. Box 1032, Fort Walton Beach, 32549, (904) 244-5281

Alachua County CoCo Special Interest Group, Chris Meyers, P.O. Box 14927, Gainesville, 32604, (904) 378-9598

Jacksonville Color Computer Club, William Brown III, 2411 Hirsch Ave., Jacksonville, 3221 (904) 721-0282

CoCo Chips Color Computer Club, 6 Belle Me Circle, Largo, 33540, (813) 581-7779

Broward County Color Computer Club, Timothy Neary, 510 S.W. 64th Ave., Margate, 33068, (30 972-4074

South Brevard Color Computer Club, Benjamin Jerome, 496 Hillside Court, Melbourne, 329 (305) 259-4609

The Naples CoCo Club, Matt Tari, 3320 7th Aven S.W., Naples, 33964, (813) 455-4830

Color-6809 Users Group, Emery Mandel, 4301 11 Avenue North, St. Petersburg, 33713, (813) 3 3570

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CoCo-AG Farm Computer Users Group, Ke Klass, Rt.1, Box 4133, Twin Falls, 83301, (2 733-4251

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Town & Country CoCo, 5461 S. Kenwood, Chica (312) 493-3748

Cook County Color Computer Club, Tim Powe 1633 Fifth Ave., Chicago Heights, 60411, (3 747-7062

Illinois Color Computer Club of Elgin, Stev Stroud, 1098 Florimond Dr., Elgin, 60120, (3 695-3186

Glenside Color Computer Club, Ed Hathaway, 8 Stevenson Drive, Glendale Heights, 60139, (3 462-0694

Kitchen Table Color Computer Group, Robert Mi P.O. Box 464, Hanover, 61041, (815) 591-337

Northern Illinois Color Computer Club, 580 Milt Lane, Hoffman Estates, 60194, (312) 885-257

Peoria Color Computer Club, Lawrence Parker, 4 Lakemper Dr., Metamora, 61548, (309) 383-4

Motorola Microcomputer Club, Steve Adler, 1 Algonquin Rd., Schaumburg, 60196, (312) 5 3044

Chicago OS-9 Users Group, 480 Gilbert Dri Wood Dale, 60191, (312) 860-2580

INDIANA

Evansville Color Computer Users Group, D Jenkins, 1418 E. Illinois Street, Evansvil 47711, (812) 424-0099

Three Rivers Users Group, George Barber, 2 New Haven Ave., Fort Wayne, 46815

Indy Color Computer Club, Mike Davis, P.O. 68702, Indianapolis, 46268, (317) 257-3300

Southern Indiana Computer Club, Route 1, Box 4 Mitchell, 47446

CoCo Program, Erik Merz, 310 Appletree Noblesville, 46060, (317) 842-1340

IOWA

Metro Area Color Computer Club, K.L. Knudtz 3324 11th Ave., Council Bluffs, 51501

Mid Iowa CoCo, Terry Simons, 1328 48th Str Des Moines, 50311, (515) 279-2576

Dubuque Tandy Users Group, Wesley Kullh 1995 Lombard, Dubuque, 52001, (319) 556-4

Iowa City TRS-80 Users Group, Susan Chapler, 6, The Woods, Iowa City, 52240, (319) 351-5

KANSAS

Kansas City CoCo Club, Mike Allinder, P.O. 11192, Kansas City, 66111, (913) 287-1904

Topeka Color Computer Club, Kevin Cronis 2224 Hope, Topeka, 66614, (913) 272-1353

Color Computer Club of Wichita, Rex Rivers, 1 N. Mosley, Wichita, 67214, (316) 264-9193

Walnut Valley C.C. Users Club, David Anders 1212 E. 4th St., Winfield, 67156, (316) 221-0

KENTUCKY

Perry County CoCo Users Group, Keith W. Sm General Delivery, Hardburly, 41747, (606) 4 4209

LOCO-COCO, Mike Standefer, 3141 Doreen W Louisville, 40220, (502) 458-6690

UISIANA

ed Stick Color Computer Club, Gary Cash, 8929 Metairie Drive, Baton Rouge, 70810, (504) 293-7799

ajun CoCo Club, Bob Hoevel, 104 Karen St., New Iberia, 70560, (318) 365-7706

ASSACHUSETTS

eater Boston Super Color Users Group, Robert Biamonte, 6 Boulder Drive, Burlington, 01803

ew England C.C. Users Group, Christopher E. Sweet, R.D. 2, Box 261, Harvard, 01451, (617) 456- 8291

assachusetts CoCo Club, Jason Rahaim, Spring St., Lunenberg, 01462, (617) 582-6514

09'ers, Jean Salvas, 204 East Street, Springfield, 01104, (413) 734-5163

CHIGAN

toskey Area CoCo Club (PAC³), Dennis Hoshield, 670 Liegl Drive, Alanson, 49706, (616) 347-0607

lor C.H.I.P.S., Jack Pieron, 3175 Oakhill Place, Clarkston, 48016, (313) 627-4358

eater Lansing Color Computer Users Group, P.O. Box 14114, Lansing, 48901

dland C.C. Club, Neil Drake, 709 Coolidge, Midland, 48640, (517) 631-2939

e Greater Kalamazoo Color Computer Club, Mike Marcelletti, P.O. Box 265, Paw Paw, 49079, (616) 657-3850

chiana CoCo Club, Clay Howe, 310 S. Jefferson St., Sturgis, 49091, (616) 651-4248

SSISSIPPI

nging River C.C. Club, Mark Welch, 3605 Vancleave Rd., # 118, Gautier, 39553

Co Art Club, Joel Bunyard, Rt. 7, Box 10, Meridian, 39301, (601) 483-0424

SSOURI

rth County 80 Group, Tom Vogel, 12 Ville Donna Ct., Hazelwood, 63042, (314) 739-4078

d-America Color Computer User's Group, Jerry Morgon, 807 Ponca Drive, Independence, 64056, (816) 796-5813

conuts, 1610 N. Marlan, Springfield, 65803

NTANA

llings C.C. Club, Jayne Kenyon, 4306 Phillip, Billings, 59101

BRASKA

S-80 Color Computer Users Group of Lincoln, Jonathan Skean, 2629 South 15th St., Lincoln, 68502, (402) 475-9815

W JERSEY

rasoft, Ravi Sakaria, 139 Candace Lane, Chatham Township, 07928, (201) 635-8025

e Kid CoCo Club, Derrick Kardos, 11 Regal Drive, Colonia, NJ 07067, (201) 382-6862

g 80 Users' Group, George R. Miller, Jr., Box 62, Glen Gardner, 08826

rden State Color Computer Users Group, Darren Nye, 5 North 20th Ave., Manville, 08835; Voice (201) 725-8385, Data (C.C.I.E. BBS) (201) 725-5028

Co Club of W. Orange, Gregg Favalora, 12 Blackburne Terrace, W. Orange, 07052, (201) 736-1748

co CoCo Club, Bud Lavin, 73B Wavercrest Ave., Winfield Park, 07036

W MEXICO

aves County Color Computer Club, Lee Mitchell, 1102 Melrose Drive, Roswell, 88201, (505) 623-0789

W YORK

irondack CoCo Club (Albany Chapter), Ron Fish, Box 4214, Albany, 12204

irondack CoCo Club, (Athens Chapter), Pete Chast, P.O. Box 61, Athens, 12015

irondack CoCo Club (Glens Falls Chapter), Dave and Richard Mitchell, 39 Center St., Fort Edwards, 12828

eensboro Color Computer Club, Bob Rosen, Springfield Blvd. & 56th Ave., Bayside, 11364, (212) 631-6233

cal CoCo, Charles Martin, P.O. Box 901, Bellmore, 11710

Broome CoCo Club, Bucky Helmer, 57 Front St., Binghampton, 13905

Kings Byte CoCo Club, Morty Libowitz, 1063 East 84th St., Brooklyn, 11236, (718) 763-4233, BBS (718) 837-2881

C.C. Club of Central N.Y., Joseph Short, 248 S. Fourth Ave., Ilion, 11357, (315) 895-7730

Rockland County Color Computer Users Group, John S. Scibran, P.O. Box 131, Monsey, 10952, (914) 357-5580

Olean Area CoCo Users Group, Herman L. Smith, P.O. Box 216, Olean, 14760, (716) 372-1170 or 372-3121

The CoCo Clan, John David, 56 Willowwood Lane, Staten Island, 10308, (718) 317-6228

New York Color Computer User Group, Carl Glovinsky, 15 Bolivar St., Staten Island, 10314, (718) 761-0268

NORTH CAROLINA

TRS-80 Users' Group of Charlotte, Jason Foodman, 240 Medearis Dr., Charlotte, 28211

Bull City CoCo Users Group, Todd Wall, 5319 Durand Drive, Durham, 27703, (919) 598-1348

Raleigh Color Computer Club, David Roper, P.O. Box 681, Garner, 27529

NORTH DAKOTA

Musica 2 Users Group (MUG), Solveig Pederson, 711 3rd Street S.E., Valley City, 58072, (701) 845-5063

OHIO

CoCo Club of Youngstown, Timothy McFadden, P.O. Box 478, Canfield, 44406, (216) 788-4218

Columbus & Central Ohio Color Computer Club, D.E. Sparrow, 19 E.N. Broadway, Columbus, 43214, (614) 268-5366

Dayton CoCo Users' Group, Steve Lewis, 4230 Cordell Dr., Dayton, 45439

Cincinnati TRS-80 Users Group, R.A. White, 44 Dow Court, Fairfield, 45014

Dayton Are Color Computer Users Group, David R. Barr, 2278 Yorkshire Pl., Kettering, 45419, (513) 293-2228

M.U.G. of CoCo—Middletown Users Group, James Carr, Middletown, 45042, (513) 424-6905

Greater Toledo Color Computer Club, Ronald L. Hall, 9646 Garden Road, Monclova, 43542, (419) 865-3663

Northeastern Ohio (N.E.O.) CoCo Club, Tony Rugue, 527 Malvern Drive., Painsville, 44077, (216) 354-2736

Tri-County Computer Users Group, William J. Loeffler, 2612 Dale Avenue, Rocky River, 44116, (216) 356-0779

Miami Valley CoCo Club, R. Douglas Wales, 2065 LeFeure Rd., Troy, 45373

OKLAHOMA

CoCo Inc., Robert L. Pace, 1726 W. Rose Oak Dr., Mustang, 73064, (405) 376-3569

OREGON

Willamette Valley CoCo Users, Brian James, P.O. Box 11468, Eugene, 97440, (503) 687-9286

PENNSYLVANIA

HUG-A-CoCo, George Lurie, 2012 Mill Plain Court, Harrisburg, 17110, (717) 657-2789

Penn-Jersey Color Computer Club, P.O. Box 2742, Lehigh Valley, 18001

CAPATUG, Inc., 340 Lewisberry Rd., New Cumberland, 17070, BBS (717) 774-6543

Skyline Color Computer Club of Berks County, Lewis F. Brubaker, 4874 Eighth Ave., Temple, 19560, (215) 921-3616

Pittsburgh Color Group, Ralph Marting, P.O. Box 351, West Mifflin, 15122, (412) 823-7607

William Tucker, P.O. Box 351, West Mifflin, 15122, (412) 466-3078

RHODE ISLAND

New England CoCo Nuts, P.O. Box 6604, Providence, 02940

SOUTH CAROLINA

Invitation Software Group, Tom Reed, 3562 Linbrook Dr., Columbia, 29204, (803) 786-0541

Midlands 80 Computer Club, Tommy Sanders, P.O. Box 7594, Columbia, 29202, BBS (803) 755-3414

Metropolitan Greenville CoCo Club, Ed Lowe, P.O. Box 6, Gray Court, 29645, (803) 876-3928

Hilton Head Island CoCo Club, Kevin Clark, P.O. Box 6187, Hilton Head Island, 29928, (803) 785-9630

Spartanburg County CoCo Club, Dennis Shattuck, 473 Royal Oak Drive, Spartanburg, 29302, (803) 583-3017

TENNESSEE

Chattanooga CoCo Club, Jim Perkins/Jim Cox, P.O. Box 9825, Chattanooga, 37412, (615) 870-2439

Tri-Cities Computer Club, Gary Collins, P.O. Box 4506 CRS, Johnson City, 37602-4506, (615) 929-1862

Foothills Micro-Computer Club, Aaron Sentell, Route 14, Box 289, Maryville, 37801, (615) 982-4629

Memphis Color Computer Users Group, Ben Barton, 4903 Warrington Rd., Memphis, 38118, (901) 795-7075 or 362-5945

TEXAS

CoCo User Group, David Karam, 1809 Dexter, Austin, 78704, (512) 442-6317

B/CS Color Computer Users Group, Dale Cuthbertson, 1812 Michael Lane, Bryan, 77801, (409) 822-0731

Deer Park Color Computer Club, Donald Burr, 4314 W. Grant, Deer Park, 77536, (713) 479-5313

International Color Computer Club, Inc., Robert L. Garrett, 2101 East Main Street, Henderson, 75652, (214) 657-7834

TRS-80 Users Group of New Braunfels, John Mendez, 408 Acorn, New Braunfels, 78130, (512) 629-3207

The San Antonio Color Computer Club, James Leatherman, 2430 Rawhide Lane, San Antonio, 78227, (512) 674-4294

UTAH

Ogden CoCo, Kathy Rush, 4535 S. 2600 W. Roy, Ogden, 84067

Salt City CoCo Club, Dennis Mott, 720 E. Browning Ave., Salt Lake City, 84105, (801) 487-6032

VIRGINIA

Northern Virginia C.C. Club, Bruce Warner, 14503 Fullerton Road, Dale City, 22193, (703) 670-4962

Central Virginia Color Computer Club, Lane Lester, 413 Woodland Circle, Lynchburg, 24502, (804) 237-4188

WASHINGTON

Northwest Computer Club, Larry Haines, East 2924 Liberty, Spokane, 99207, (509) 483-5547

WEST VIRGINIA

Kanawha Valley Personal Computer Club, P.O. Box 5354, Charleston, 25311, BBS (304) 925-3338 or 345-6502

Mtn. State CoCo Users Group, Donald G. Barber, Jr., P.O. Box 1084, Morgantown, 26507, (304) 599-4493

Mil-O-Bar Computer Club, Jim LeMaster, P.O. Box 130, Ona, 25545, (304) 743-4752 after 4 p.m.

Blennerhassett CoCo Club, David Greathouse, Rt. 9, Box 119, Parkersburg, 26101

West Virginia Color Computer Club, William Mucklow, 949 Baier Street, St. Albans, 25177, (304) 727-6764

WISCONSIN

CoCo-MUG, Tom Fandre, P.O. Box 10152, Milwaukee, 53210, (414) 542-0600

Southern Wisconsin CoCo Club, David C. Buehn, P.O. Box 411, Twin Lakes, 53181

CANADA

ALBERTA

Calgary Color Computer Club, Don Towson, 832 Cannell Rd. S.W., Calgary, T2W 1T4, (403) 281-2855

Edmonton CoCo Users Group, Dexter Dombro, P.O. Box 4507 Stn. South, Edmonton, T6E 4T7, (403) 461-4750

Medley Computer and Electronics Club, P.O. Box 1267, Medley, T4A 2M0

BRITISH COLUMBIA

North Island CoCo Club, Ann Marie MacKay, P.O. Box 1740, Port Hardy, V0N 2P0

Salmon Arm CoCo, David Coldwell, 2981 N. Broadview, Salmon Arm, V0E 2T0, (604) 832-8247

MANITOBA
Winnipeg Micro-80 Users Group, Mel Seder, 884 Ash St., Winnipeg, R3N 0R9, (204) 284-0376

NEW BRUNSWICK
Color Computer Moncton Users Group (CoCoMUG), Leo Allain, 91 Woodland Dr., Moncton, E1E 3C4, (506) 382-2190

NEWFOUNDLAND
Avalon CoCo Club, A.R. Thompson, 10 Foran St., St. John's, A1E 4G1

NOVA SCOTIA
Halifax Dartmouth CoCo Users Group, P.O. Box 572, Dartmouth, B2Y 3Y9, (902) 469-3656

ONTARIO
International Adventurer's Club, Maurice Dow, 84 Camberley Cres., Brampton, L6V 3L4
K-W C.C. Club, Peter Karwowski, 23 Hudson Crescent, Kitchener, N2B 2V7
Kingston CoCo Club, Kenneth Bracey, 316 Westdale Ave., Apt. 4-C, Kingston, K7L 4S7, (613) 544-2806
London CoCo Nuts Computer Club, Harry K. Boyce, 180 Concord Road, London, N6G 3H8, (519) 472-7706
Meadowvale Color Computer Club, Howard Porter, P.O. Box 186, Streetsville, Mississauga, L5M 2B8
Niagara Regional CoCo Club, Harry VanDyke, 7707 Jubilee Drive, Niagara Falls, L2G 7J3
Ottawa 6809 Users Group, Norm Shoihet, 1497 Meadowbrook Road, Ottawa, K1B 5J9, (613) 741-1763

QUEBEC
Club d'Ordinateur Couleur du Quebec, Inc., Centre de Loisirs St-Mathieu, 7110- 8e Ave., St-Michel, Montreal, H2A 3C4, (514) 729-8467
South Shore CoCo Club, Jacques Bedard, 33 Lisilre, St-Constant, P.Q., J0L 1X0
Le Club Couleur du Nord, Gabriel Pigeon, RR 2, Ville Montel, J0Y 2S0, (819) 732-2346

SASKATCHEWAN
Regina Color Computer Club, Georges Glass, 26 Tweedsmuir Bay, Regina, S4X 2B1, (306) 949-3942
Saskatoon Color Computer Club, L. Curtis Boyle, 35 Bence Crescent, Saskatoon, S7L 4H9

AUSTRALIA
Blacktown City TRS-80 Colour Computer Users Group, Keith Gallagher, P.O. Box 264, Riverstone, New South Wales, 2765
CoCo Colyteens of Colyton, Dwayne Manson, P.O. Box 506, St. Marys, New South Wales, 2760
Color Computer Penrith User Group, Alexander Schofield, 15 Tasman Avenue, Lethbridge Park, New South Wales, 2770
The Hills District Color Computer Club, Andrew Rankin, 42 Lucas Road, Seven Hills, New South Wales, 2147, phone (02) 674-3741
CoCoHUG (Color Computer Hobart Users Group), Robert Delbourgo, 15 Willowdene Avenue, Sandy Bay, Hobart, Tasmania, 7005

MEXICO
MEXCOCO Users Group, Sergio Waisser, Pachuca 87-109, Mexico City D.F., 06140, phone 553-11-98

WEST GERMANY
First CoCo Club Hamburg, Theis Klauberg, 2000 Hamburg 65, Op de Solt 53 a, West Germany

new clubs

Editor:

The California Computer Federation is proud to announce the following branch chapters.

San Fernando Valley Chapter: Jim Sutemeier, 9565 Reseda Blvd., # 324, Northridge 91324.

Sacramento Chapter: Mike Faulkin, 828 San Tomas Drive, Davis, 95616.

San Francisco Chapter: Dick Stanich, P.O. Box 7007, Redwood City, 94063.

Jim Sutemeier
Northridge, CA

• The TRS-80 Users Group of Central Connecticut meets the second Tuesday of each month at Bonanza Restaurant in Manchester. Optional dinner 5-7 p.m.; meeting from 7-9 p.m. For more information write to P.O. Box 1575, 06144.

Armand A. Korzenik
Hartford, CT

• I would like to announce the formation of CoCoNet 1 of Polk county. This users group runs the same way as the Adirondack Color Computer Club of New York, and we would like to get in touch with other user groups in Florida that are interested in forming a CoCoNet "Chapter." We have a large software library, newsletter and a CoCoNet BBS. For information on joining or starting a chapter contact me at (813) 859-2629 or write to 1109 Old Polk City Road, 33805.

Steve Dale
Lakeland, FL

• Please announce the formation of the Custom Key Computer Club. Contact me at (305) 281-0325 or write to 1016 Malaga Drive, 32822.

Dan Mills
Orlando, FL

• The Brownsburg Color Computer Club meets the first and third Saturday of each month at 6 p.m. at the Brownsburg United Methodist Church on the corner of State Road 267 and Tilden Street, ¼ mile south of Highway 136. The meeting on the first Saturday of each month is a regular business meeting and the meeting on the third Saturday is reserved for demonstrations, etc.

Leroy Perry
Danville, IN

• I would like to announce a users group for the Fort Knox/Radcliff area. The group meets on the first and third Thursdays at 7:30 p.m. For more information and the meeting place, contact the local Radio Shack store or write to me at 9049 E. Estrada Avenue, 40121.

Bruce Metcalf
Fort Knox, KY

• We are the Red River CoCoNuts fro
Shreveport. Our club has been in existenc
for over a year and we've had lots of fun an
learned a great deal about our compute
from each other. We invite individuals an
clubs in the area to come and visit u
Meetings are held every other Saturda
afternoon. Contact me at P.O. Box 562
71135.

Doug Miniut
Shreveport, L

• I would like to announce the start of
Color Computer users club, the Crystal Bal
Anyone can join. Dues are $5 a year.
monthly newsletter with program listin
will be sent each month. Anyone intereste
write to me at P.O. Box 293, 48476.

Chris Case
Vernon, M

• We are pleased to announce the form
tion of a Color Computer users group i
central Missouri. For information call Er
at (314) 445-2974 evenings and weekends,
me at (314) 445-6536.

Phil Smi
Columbia, M

• Please inform your readers that th
Microcomputer Users Group of St. Charl
county is now forming. All help fro
existing groups will be graciously appr
ciated. Write me at 1175 Perry Street, 633
or call (314) 946-4301.

Kevin J. Doa
St. Charles, M

• A new national CoCo Art Club is star
ing in Meridian. We plan to have a month
newsletter, discount prices on softwar
contests, a CoCo gallery (similar to TH
RAINBOW's), software library, BBS/DAT
library (just for art) and many other fe
tures. If anyone has any ideas or would lik
to become a member please write to CoC
Art Club, Rt. 7, Box 10, 39301.

Joel Bunya
Meridian, M

• I would like to inform everyone aroun
the Sioux City area we have a club th
meets once a month to review hardware an
software. Everyone is welcome; we have n
dues or fees. The meetings are held on th
first Tuesday of each month at 7:30 p.m
Retail Data Systems, 125 Sixth Stree
51103. If you have any questions write to m
at 611 D Street, 68776, or call (712) 258-17
(work) or (402) 494-2284 (home).

Alan Pederse
South Sioux City, N

• I'd like to announce a new CoCo cl
in West Orange. Members receive a month
newsletter that contains BBS number
graphics programs, contests and lots mor
If you would like to join, send either
quarter or a 22 cent stamp to: CoCo Cl
of W. Orange, 12 Blackburne Terrace, 0705

Gregg Favalo
West Orange,

• The Rockland County Color Comput
Users Group now holds its monthly meeti

Building A of the Pomona Health Com- ex. For a list of meeting dates and other formation, please contact RCCCUG, P.O. ox 131, 10952.

Harold L. Laroff
Monsey, NY

We are starting a new computer club lled the Bits and Bytes CoCo Club. There ill be a newsletter sent every month. It will ntain programs, tips, clues and ideas. This ub is sure to spark your excitement and terest on all aspects of the CoCo. For formation write to 94 Broadway, 12887.

Ted Barkley
Whitehall, NY

I am looking for Color Computer users the Goldsboro/Wayne County area who ish to start a CoCo club. If anyone is terested please contact me at 208 Saddle- ood Drive, 27530, phone 778-7820 or ompuServe 72207,1114.

Ray Fowler
Goldsboro, NC

I am trying to organize a CoCo group the Wheeling area. Anyone interested can rite me at 3735 Stark Street, 43906.

Charles Roman
Bellaire, OH

I would like to hear from all CoCo vners or prospective owners in the Enid ea. Several of us are interested in starting users group, possibly with a BBS as well. iose interested should write to me at 724 Maple, 73701.

David M. Graham
Enid, OK

I am interested in forming a CoCo club ound the Johnstown or Indiana area. I iow there are many avid readers of THE INBOW around. Anyone interested con- ct me at (412) 676-5485 or write Rt. # 1, x 38, 15949.

Bob Mowery
Robinson, PA

We have started a CoCo users group and sh to invite anyone to attend our meetings. e meet on the first Monday of each month Cleveland State Community College, chnical Building, Room 217. Further ormation can be obtained by calling me 479-5537 or writing me at Rt. # 2, Box 36, 37311.

Brian S. Graham
Cleveland, TN

The Tri-Cities Computer Club currently s about 40 members and supports interest all computers. We are planning a newslet- , a club library available to members, ssibly a BBS, BASIC and other program- ng languages. We would appreciate re- ving newsletters from other users groups d any tips we can get. Those interested ould contact us at P.O. Box 4506 CRS, 602.

Gary Collins
Johnson City, TN

I am attempting to start a CoCo users club in the western Washington area. We have a reliable 24 hour BBS (Colorama) aimed at providing total support to users from new owners to advanced programmers. Anyone interested in either can contact me at (206) 435-9592, or preferably BBS, (206) 435-4308.

Thomas B. Frey
Arlington, WA

- Skagit Computer Users Forum meets the third Wednesday of every month at 7:30 p.m. Skagit Valley Community College provides us with a room in their Technical Building, usually Room T-25. The meetings are open to all. We mail a newsletter to members (a $10 annual fee). We can be reached by writing to P.O. Box 2128, 98273.

Scott Honaker
Mount Vernon, WA

- I would like to inform anyone in the area of Chilliwack there is a club for CoCo owners. We meet the first and third Monday of every month at the Thurston Room on the CFB. For more information call (604) 858-2485. Anyone interested in corresponding, our mailing address is: CHWK CoCo Club, c/o Jeff Russell, 6107 Glengarry, Sardis, V2R 2H7.

Jeff Russell
Chilliwack, British Columbia

- The Kingston CoCo Club now meets on alternate Mondays at Kingston City Hall. For information call me at 389-0467 or Ken at 544-2806. Our mailing address is 1413 Woodbine Road, RR #3, K7L 4V2.

Kanti Dinda
Kingston, Ontario

- Le Club D'Informatique et D'Electronique Laval invites all those who are interested in becoming a regular member to write me at 410 Chanoine-Pepin, J3G 3A7.

J. Hardy
Beloeil, Quebec

- I would like to announce the start of the B.E.S.T. CoCo Club. We have a newsletter containing hints, contests, programs and a lot more. For more information write to 808 du Chateau, J3H 1N4.

Dr. Jones
St-Hilaire, Quebec

- The Orange Colour Computer Club meets on the second Sunday of the month at a local high school and we are supported by our local Tandy store manager. For more information write me at P.O. Box 1362, Orange, New South Wales, 2800.

Jim James
Orange, New South Wales, Australia

- I would like to mention that the Gladstone Park CoCo Club meets in a portable classroom behind the Gladstone Park High School in Melbourne every fortnight at 2 p.m. Write me at 4 Burwood Court, Thomastown, Melbourne, Victoria, Australia 3074.

Wenlock Burton
Melbourne, Victoria, Australia

TIME BANDIT

Bill Dunlevy & Harry Lafnear

Tired of the same old screens? In TIME BANDIT, you pick from more than TWENTY places with over 15 levels in each place. That's over 300 screens! Visit FANTASY WORLD, WESTERN WORLD, & SPACE WORLD. Fight the Evil Guardians: Killer Smurphs, the Looking Lurker, Angry Elmo and more! Find the Keys and collect the treasures of time! Crisp Supergraphics, colorful SCROLLING landscapes, full animation, and over THREE HUNDRED SCREENS! The conquest of time and space awaits you!

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Bill Dunlevy & Doug Frayer

Explosive color, fast-moving animation and amazing sound make this non-violent game a classic! Different levels and more than FORTY screens offer as much challenge & good clean fun as you can take! Play solo or enjoy the challenge of two-player simultaneous competition. Scramble to get the loot first, but be careful: the KATS are prowling and your opponent is tossing eggs!

32K Tape $27.95/Disk $29.95

SUPER PAINT

by John Crane

Super Paint is an exciting new enhancement for your Graphicom drawing system. Break the chains restricting your creative freedom! Now you can draw and paint with every color your machine is capable of. Over 250 colors are available at all times! It's no longer impossible to find just the right shade or texture. Super Paint brings the COLOR back into your Color computer! Requires Graphicom system.

32K Disk $19.95

MichTron

576 South Telegraph
Pontiac, Michigan 48053
(313) 334-6576

JOYSTICKS, TOUCH PADS AND DIGITIZING THE WORLD

By William Barden, Jr.

I hate computers. They're cantankerous, unreliable and hard to use. Ah, but the things you can do with them! My latest series of misadventures began with a course I'm taking in the Japanese language. The written Japanese language uses three types of symbols — Hiragana, Katakana and Kanji. Kanji is derived from Chinese symbols and uses "ideographs" to represent objects. The symbol shown in Figure 1, for example, represents a dog. Hiragana and Katakana, on the other hand, represent phonetic sounds, such as "ga" or "ka" as shown in the same figure.

(William Barden, Jr. is a master communicator in a field in which he is one of the few recognized experts — microcomputers. A prolific author of more than 27 books on computers and computer programming, Bill also has authored several instructional software projects for Tandy/Radio Shack.)

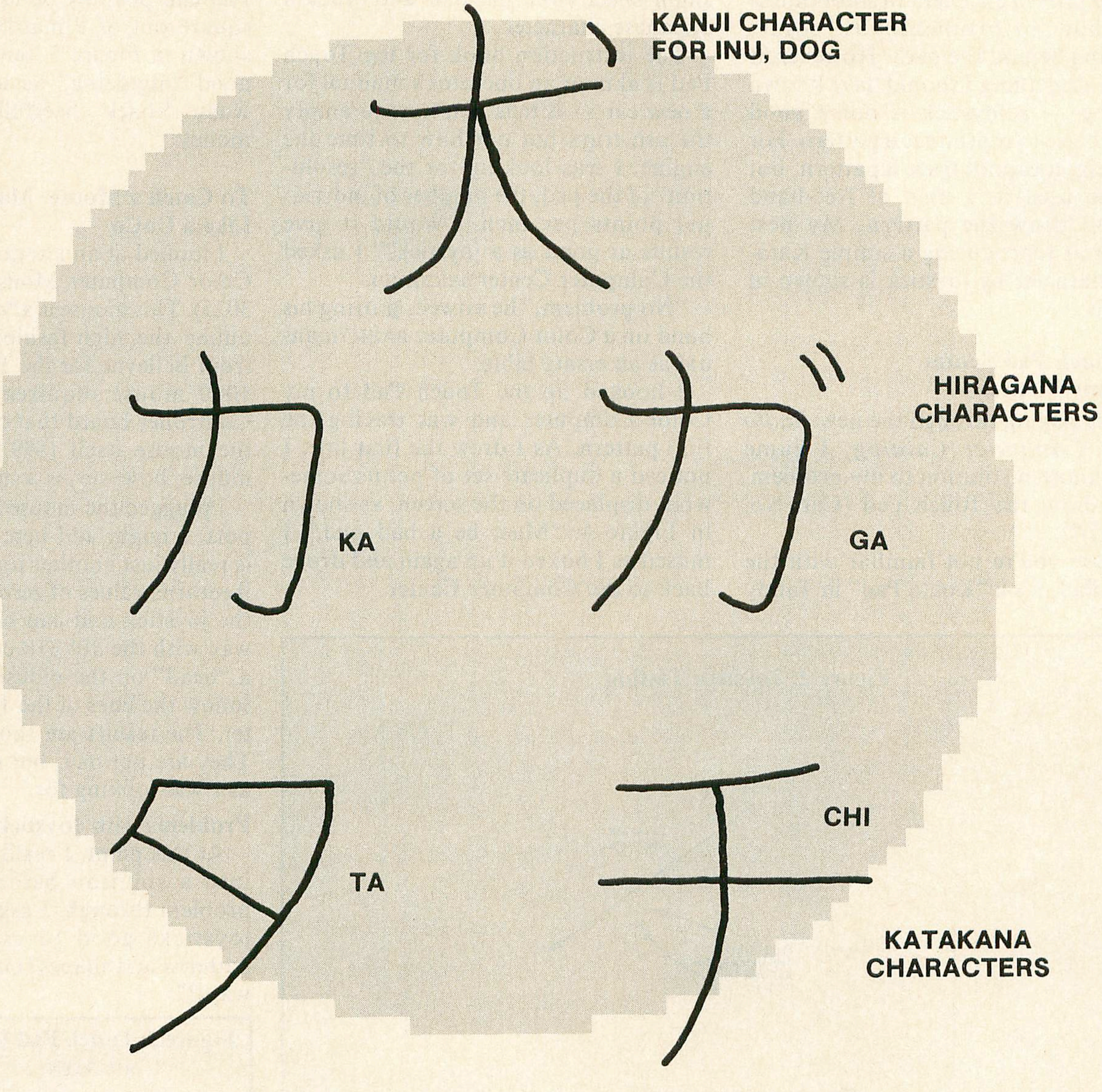
As usual, I was attempting to use a computer to solve a real-world problem. Wouldn't it be neat, I reasoned, if I could convert the Japanese symbols to Color Computer screen symbols? Then I could drill myself on them and use the Color Computer as a silicon sensei!

This goal yielded all kinds of interesting results I'd like to share. Some of the results are good and some are bad. They involve joysticks, old and new, tou pads, mouse devices and other te niques. They all fall into an area I c "digitizing patterns."

The techniques talked about can applied on any Color Computer syste whether it's a 16K cassette-based syst or a 64K OS-9 system. We'll stick to basics in this discussion, so as not leave any beginners in the dust. T only requirement is that you ha Extended Color BASIC in a 16K syst

How to Take the "Joy" Out of Joystick

My first thought in converting Japanese characters to screen patte was to try a joystick in free-hand dr



g. This proved to be a disaster, how- er. For one thing, my joysticks, unlike e wine, have not improved with age. quick check revealed that they did not produce a smooth pattern on the een.

I used the program, *Joystick Test*, own in Listing 1 to try them out. This ogram uses the `JOYSTK` command to d in joystick values from the 'X' ection (`JOYSTK(0)`) and from the 'Y' ection (`JOYSTK(1)`), then plots them the screen in high resolution mode. e'll use high resolution mode, `PMODE` in these examples, assuming that we nt the maximum resolution, or mber of points on the screen.)

The `JOYSTK` command reads a value of zero through 63 representing the joystick 'X' or 'Y' position on the screen. Zero is the extreme left or top position, while 63 is the extreme right or bottom position. We multiplied the 'X' value by four to convert it to zero through 252 and the 'Y' value by three to convert it to zero through 189 to get a display on the entire screen, rather than just the upper left quadrant.

To use Listing 1, move the joystick smoothly in the 'X' and 'Y' directions. Make sure all new points appear in the direction the joystick is moving and not "behind" the path, as shown in Figure 2. If points appear behind the path, your joystick is bad, or at least not very good for digitizing. Make certain also that you can get to all corners of the screen.

If you have a newer "Deluxe" joystick (Cat. No. 26-3012), the 'X' and 'Y' "trim tab" controls can be adjusted to center the joystick initially. You should also set the movement to "free" by the switches on the bottom of the joystick.

When I tried the program of Listing 1 on my older joysticks (Radio Shack Cat. No. 26-3018), I found that operation was erratic, with points displayed behind the path and abrupt jumps from one screen position to a new one an eighth of a screen away. I ended up throwing both sticks away after they expired during an emergency operation using contact cleaner.

A Deluxe Solution to the Joystick Problem

My next step in the quest for Kanji was to get a new Deluxe joystick. The new one proved excellent in smoothness and I had no problem with points appearing behind the path. However, it verified something I should have known all along — a joystick is not a good device to use to reproduce a pattern. For one thing, it cannot trace a pattern, but must be used in a kind of free-hand mode to draw the pattern. My best attempt at reproducing a simple Katakana character by joystick is shown in Figure 3.

The Touch Pad Scores too many Points!

While paging through the new *Radio Shack Computer Catalog*, I came across another solution to my problem. What about the Touch Pad (Cat. No. 26-1185)?

In case you're not familiar with the Touch Pad, it's a "Koala Pad" in Tandy clothing. Like a joystick, it returns an X/Y position, but instead of a stick that moves in two directions, you use a "stylus" on a tablet. As the stylus touches the pad, the proper X/Y coordinates are returned. It sounded perfect for my needs, as I could simply place a small sheet over the pad and trace a Japanese character.

The instruction book for the Touch Pad is akin to an operator's manual for a new car — it tells you how to empty the ash trays but not how to time the engine. I was looking for the "resolution" of the pad, the number of individual points per inch. "Would it give results as good as a joystick?" I asked the Computer Center salesman.

"No problem," he vowed, putting his hand on a Color Computer BASIC manual as an ersatz bible.

I hooked up the Touch Pad to my Color Computer and was tracing the first pattern. As I drew the first line, I noticed a duplicate set of points somewhat displaced on the screen, as shown in Figure 4. "Must be a bad pad," I mused as I boxed it up again and drove back to the Computer Center.

After trying a second Touch Pad, was convinced the problem was in th design of the pad. Thumbing throug some reviews of the Touch Pad in m magazine collection and a brief conve sation with another computer writ confirmed my suspicions. The Touc Pad can possibly be used to select o square out of a matrix of squares, shown in Figure 5, but is simply not good "digitizing" device. Fortunatel Radio Shack cheerfully refunds yo money.

To Catch a Mouse, Make a Noise Like a CoCo

I looked at an alternative device, th Color Computer Mouse (Cat. No. 2 3025). This mouse is a "country" mous unlike the high-fashion "city" mou from Bellevue for the Tandy 1000. Th 1000 mouse requires a Digi-Mou Controller board that costs as much the mouse itself ($99.95). The CoC mouse, however, is a steal at $49.95.

I plugged the mouse into the joysti port. I might add here that the mou is really just another form of a joystic it returns values of zero through 63 li the joystick and can be read the sar way with the `JOYSTK` commands. I p a "head" on the mouse and used it follow the lines of the Japanese chara ter. The results are shown in Figure They are not bad, but still not as go as I was looking for.

Problems with Joysticks

At this point, I realized I had rush into a solution before thinking t problem through. I asked myself, "A joysticks good to use for digitiz patterns and shapes? Or are there bett ways?"

Figure 2: Joystick Testing

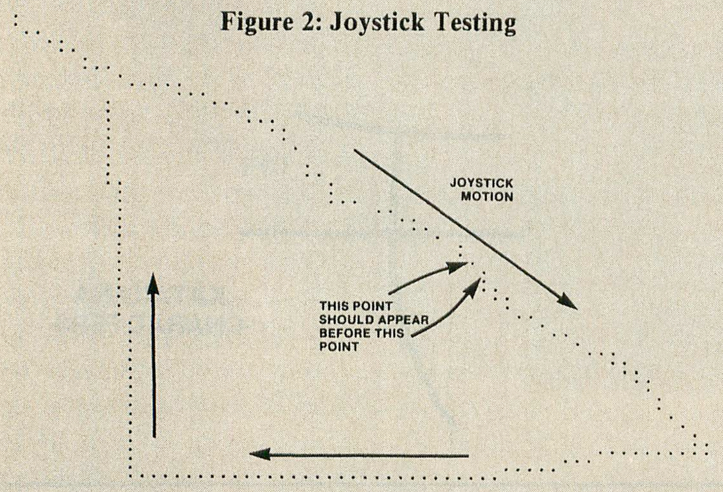


Figure 3: Katakana Characting Using Joystick

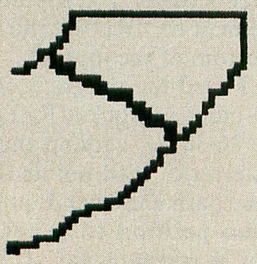


Figure 4: Touch Pad and Spurious Points

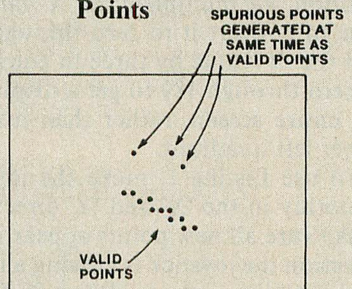
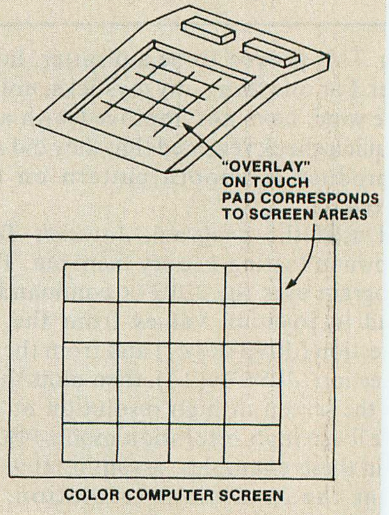


Figure 5: Touch Pad Use in Selectin an Area



One of the problems with the joytick, Touch Pad or mouse on the Color omputer is that the best resolution is nly 64 by 64 points on the screen. As e'd like 256 points horizontally by 192 oints vertically, basic joystick operaon leaves something missing, namely hree points in between each joystick oint! We can "pad out" those points by rawing line segments, but the results re still not the best. (See Listing 2, *oystick Line Tracer*, for a program to ll in the missing points and Figure 7 r the results.)

An alternative is to use the three evices on only one screen quadrant at time, as shown in Listing 3, *Joystick uadrant*, and Figure 8. Each press of e space bar switches to the next screen uadrant. Holding down the firebutton n the joystick or mouse inhibits writing n the screen so the screen position can changed.

Another problem with a joystick-type evice is that it's virtually impossible to roduce a pattern without "garbage" oints that must be cleaned up, as own in Figure 9. What's really needed a "pattern editor."

ardware Solutions to Digitization

One possible solution to the digitizaon problem is a piece of equipment om Colorware, Inc., known as *CoCo ax*. This product circumvents the low solution capability of the joystick put by using its own joystick electronics. A total of 256 points instead of 64 points can be read in from a standard joystick or mouse to match the the maximum screen resolution.

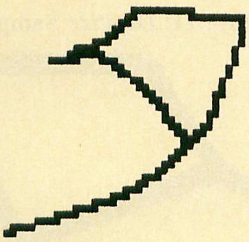


Figure 6: Katakana Character Using a "Mouse"

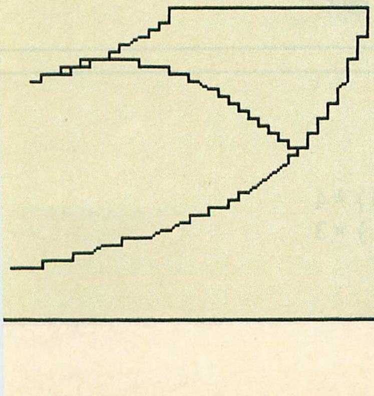


Figure 7: Using a "Line" Program to Fill in Points

In addition to the increased joystick resolution, *CoCo Max* contains a complete graphics package for higher screen resolution. It allows shapes and patterns to be drawn and manipulated in methods very similar to the MacIntosh's *MacPaint* program. (To be honest, I have not tried the product but it looks very interesting.)

A second hardware solution to the digitizing problem is a better resolution graphics tablet. Radio Shack has one with the GT-2000 Graphics Tablet, and it allows up to 200 pixels per inch. However, its cost of $599.95 is most likely prohibitive to the typical Color Computer user.

Another possible hardware solution is a digitizing television device. These are available from RAINBOW advertisers, such as The MicroWorks — their DS-69 Video Digitizer is $149.95. Video digitizers take a television image from a black-and-white camera or VCR and convert the television picture into patterns for display on the Color Computer screen. Again, this solution involves quite a bit of cash outlay when a television camera and other options are added in. Also, the resulting digitized picture takes a good deal of memory or disk space.

Along the same lines, Forrest Mims III, of Radio Shack *Engineer's Note-*

Figure 8: Quadrant Program Operation

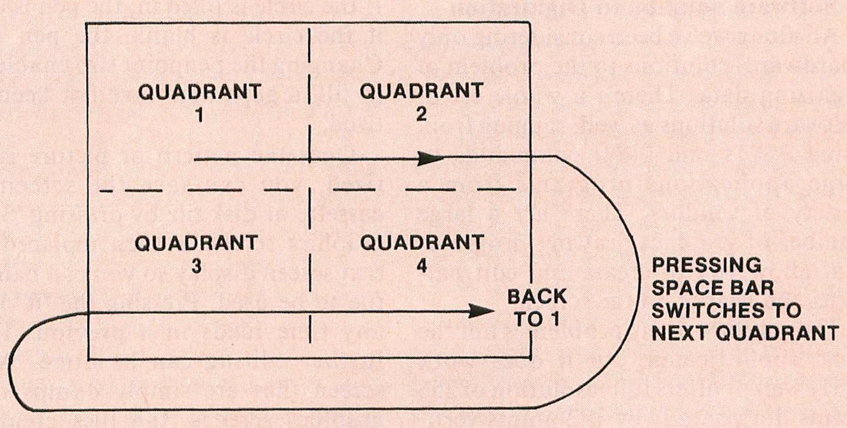
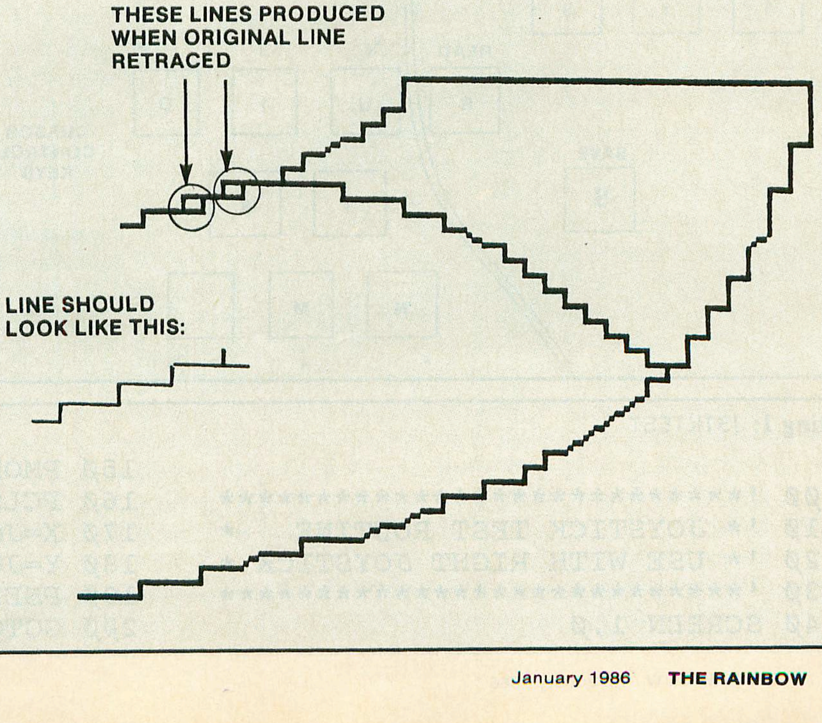


Figure 9: "Garbage" Points on Screen



THESE LINES PRODUCED WHEN ORIGINAL LINE RETRACED
LINE SHOULD LOOK LIKE THIS:

book fame, did some experiments using a photocell device that digitized images from paper put into a "plotter." The same technique can be used by attaching the device to the print head of a Color Computer printer. The print head of the printer is moved a character position at a time (or less, if the graphics mode is used) under program control. For each new character position, the output of the photocell is converted into a black or white level, which is read by the Color Computer from the joystick port.

This scheme is not new, but is particularly attractive for the Color Computer because of the built-in analog-to-digital converter logic of the joystick port. For those who are interested, see *Forrest Mims' Computer Projects* (McGraw Hill, 1985).

A Software Solution to Digitization

All along we've been considering only "hardware" solutions to the problem of digitizing data. There's a whole set of software solutions as well, ranging from using PSETs and DRAW commands to large applications programs from a variety of vendors. There are a large number of graphics drawing programs that allow you to create and edit patterns and shapes on the screen.

The solution to my problem is not the most sophisticated, but it does work fairly well. It offers full resolution of 256 points horizontally by 192 points vertically. It is fairly quick and allows editing of the data. It works well for the problem I was interested in, and should work for similar types of problems you might have in digitizing data. I call it *Digitize*; the program is shown in Listing 4. It works on any Extended BASIC CoCo with at least 16K of memory.

Digitize uses cursor positioning keys to move a graphics cursor around the screen, as shown in Figure 10. As the cursor is moved, it draws a line. The cursor can also be moved without drawing a line by "toggling" a pen up/pen down condition.

Many times you'd like to draw a broader line than just one pixel width, so the size of the line can be increased by selecting a larger "penpoint." The size of the penpoint is shown on the screen by a circle on the screen bottom. If the circle is filled in, the pen is down; if the circle is blank, the pen is up. Changing the penpoint size enables you to fill in gaps that have not been digitized.

Once the pattern or picture is digitized, you can save the screen to a cassette or disk file by pressing 'S'. The graphics screen is then replaced by a text screen display so you can name the file to be used. Pressing the 'R' key at any time reads in a previous file so further editing can be done. As the screen files are simply dumps of the graphics screens, the files created in your own BASIC programs can be use for further processing.

Digitize allows you to easily do di itizations of simple shapes, and whi admittedly is not a full-fledged graphi program, it is short, easy to use an foolproof. I've used *Digitize* to digiti Japanese characters (see Figure 11) an other patterns, shapes and drawing and use the following approach f rapid entry: Using a copier servic make a transparency of the pattern be reproduced. Tape this transparen to the television screen and use t cursor controls to trace the pattern.

Alternatively, you can simply tape piece of plastic wrap to the screen a use a grease pencil to draw the patte to be digitized upon the plastic wra *Digitize* works much faster than co structing elaborate sequences of DR commands to produce patterns a shapes.

In my quest to reproduce Kanji a Katakana patterns I have gone throu several approaches and learned th computers can't do everything. Som human intervention is necessary unle you're willing to lay out hundreds dollars for television digitization sy tems or digitizing tablets, and even th the results would probably not be expected.

I really do hate computers, but I' learned to live with my Color Comp ter, and *Digitize* is another concessi on my part for using the power of t Color Computer to solve a perplexi real-world problem.

Figure 10: Cursor Positioning and Option Keys

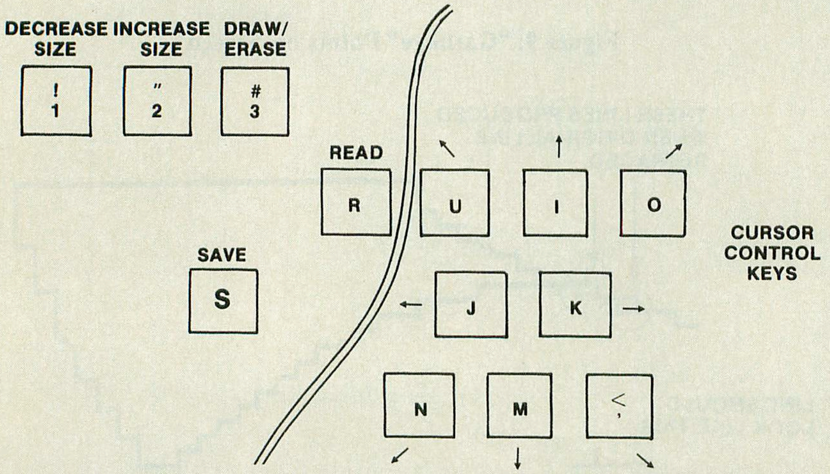
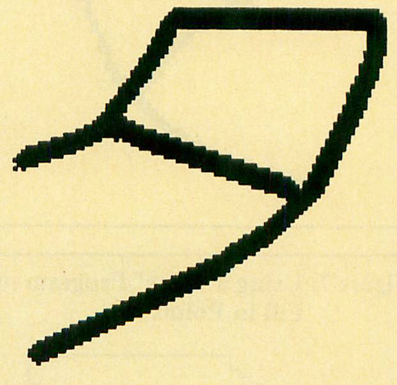


Figure 11: ***Digitize*** **Sample**



Listing 1: JSTKTEST

```
100 '****************************
110 '* JOYSTICK TEST ROUTINE    *
120 '* USE WITH RIGHT JOYSTICK *
130 '****************************
140 SCREEN 1,0
150 PMODE 4,1
160 PCLS
170 X=JOYSTK(0)*4
180 Y=JOYSTK(1)*3
190 PSET (X,Y)
200 GOTO 170
```

Listing 2: JSTKLINE

```
100 '****************************
110 '* JOYSTICK LINE TRACER     *
120 '* FILLS IN LINES BETWEEN   *
130 '* POINTS. HIT ANY KEY TO   *
140 '* CLEAR SCREEN.            *
150 '****************************
160 SCREEN 1,0
170 PMODE 4,1
180 PCLS
190 XX=JOYSTK(0)
200 YY=JOYSTK(1)
210 A$=INKEY$:IF A$<>""THEN PCLS
220 X=JOYSTK(0): Y=JOYSTK(1)
230 LINE (XX*4,YY*3)-(X*4,Y*3),
    PSET: XX=X: YY=Y
240 GOTO 210
```

Listing 3: JSTKQUAD

```
100 '****************************
110 '* JOYSTICK QUADRANT ROU-   *
120 '* TINE. PRESS SPACE BAR TO*
130 '* MOVE TO NEXT QUADRANT.   *
140 '* PRESS CLEAR TO CLEAR     *
150 '* SCREEN. PRESS JOYSTICK   *
160 '* "FIRE" BUTTON TO MOVE    *
170 '* WITHOUT DRAWING LINE.    *
180 '* USE WITH RIGHT JOYSTICK *
190 '****************************
200 SCREEN 1,0
210 PMODE 4,1
220 PCLS
230 QUAD=0
240 XB=0: YB=0
250 XX=JOYSTK(0): YY=JOYSTK(1)
260 A$=INKEY$
270 IF A$=CHR$(12)
    THEN PCLS: GOTO 330
280 IF A$<>" " THEN 330
290 QUAD=QUAD+1
300 IF QUAD=4 THEN QUAD=0
310 IF QUAD=0 OR QUAD=2
    THEN XB=0 ELSE XB=128
320 IF QUAD=0 OR QUAD=1
    THEN YB=0 ELSE YB=96
330 X=JOYSTK(0): Y=JOYSTK(1)
340 IF (PEEK(&HFF00) AND 1)=0
    THEN 360
350 IF (PEEK(&HFF00) AND 1)=1
    THEN LINE(XX*2+XB,YY*1.5+YB)
    -(X*2+XB,Y*1.5+YB),PSET
360 XX=X: YY=Y
370 GOTO 260
```

```
380 ......116
570 .......93
730 .......87
END .....139
```

Listing 4: DIGITIZE

```
100 '****************************
110 'DIGITIZE PROGRAM. DIGITIZES
120 'BY MOVING SCREEN TRACE UN-
130 'DER TRANSPARENT OVERLAY.
140 ' I=MOVE UP; O=MOVE UP,RGHT;
150 ' K=MOVE RIGHT; <=MOVE DWN,
160 ' RIGHT; M=MOVE DOWN;N=MOVE
170 ' DOWN, LEFT; J=MOVE LEFT;
180 ' U=MOVE UP, LEFT; S=SAVE;
190 ' R=READ; 1=DECREASE LINE
200 ' SIZE; 2=INCREASE LINE
210 ' SIZE; 3=TOGGLE CURSOR OFF
220 ' AND ON.
230 '****************************
```

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```
240 CLS
250 SCREEN 1,0
260 PMODE 4,1
270 PCLS
280 RADIUS=0
290 PEN=1
300 X=128
310 Y=96
320 GOSUB 380
330 GOSUB 800
340 GOSUB 450
350 GOTO 330
360 '****************************
370 'SUBROUTINE TO DRAW LEGEND
380 LINE (0,165)-(30,191),
    PRESET,BF
390 IF RADIUS=0 AND PEN=1
    THEN PSET(15,180)
400 IF RADIUS<>0 AND PEN=0
    THEN CIRCLE (15,180),RADIUS:
    GOTO 420
410 IF RADIUS<>0 AND PEN=1
    THEN CIRCLE (15,180),RADIUS:
    PAINT (15,180)
420 RETURN
430 '****************************
440 'SUBROUTINE TO READ KEY.
450 A$=INKEY$: IF A$="" THEN 450
460 IF A$<>"I" THEN 480
    ELSE Y=Y-1
470 GOTO 770
480 IF A$<>"O" THEN 510
    ELSE Y=Y-1: IF Y<0 THEN Y=0
490 X=X+1: IF X=256 THEN X=255
500 GOTO 770
510 IF A$<>"K" THEN 530
    ELSE X=X+1: IF X=256
    THEN X=255: GOTO 770
520 GOTO 770
530 IF A$<>"<" AND A$<>","
    THEN 560 ELSE X=X+1:
    IF X=256 THEN X=255
540 Y=Y+1: IF Y=192 THEN Y=191
550 GOTO 770
560 IF A$<>"M" THEN 580
    ELSE Y=Y+1: IF Y=192
    THEN Y=191
570 GOTO 770
580 IF A$<>"N" THEN 610
    ELSE Y=Y+1: IF Y=191
    THEN Y=191
590 X=X-1: IF X=-1 THEN X=0
600 GOTO 770
610 IF A$<>"J" THEN 630 ELSE
    X=X-1: IF X=-1 THEN X=0
620 GOTO 770
630 IF A$<>"U" THEN 660 ELSE
```

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```
     X=X-1: IF X=-1 THEN X=1
 640 Y=Y-1: IF Y=-1 THEN Y=1
 650 GOTO 770
 660 IF A$<>"I" THEN 680:
     Y=Y-1: IF Y=-1 THEN Y=0
 670 GOTO 770
 680 IF A$<>"2" THEN 700
     ELSE RADIUS=RADIUS+1:
     IF RADIUS>10 THEN RADIUS=10
 690 GOSUB 380: GOTO 770
 700 IF A$<>"1" THEN 720
     ELSE RADIUS=RADIUS-1:
     IF RADIUS=-1 THEN RADIUS=0
710 GOSUB 380: GOTO 770
720 IF A$<>"3" THEN 740
    ELSE IF PEN=0 THEN PEN=1
    ELSE PEN=0
730 GOSUB 380: GOTO 770
740 IF A$<>"S" THEN 750
    ELSE GOSUB 850: GOTO 770
750 IF A$<>"R" THEN 760
    ELSE GOSUB 950
760 IF A$<>"C" THEN 770 ELSE 240
770 RETURN
780 '****************************
790 'SUBROUTINE TO DRAW POINT
     OR CIRCLE
800 IF RADIUS<>0 THEN CIRCLE
    (X,Y),RADIUS,PEN: GOTO 820
810 IF RADIUS=0 THEN IF PEN=0
    THEN PRESET(X,Y) ELSE
    PSET(X,Y)
820 RETURN
830 '****************************
840 'SUBROUTINE TO SAVE GRAPHICS
     SCREEN
850 SCREEN 0,0
860 CLS
870 INPUT "SAVE FILE NAME"; A$
880 IF A$="" THEN 910
890 SAVEM A$,&H0E00,&H25FF,
    &H0E00
900 'USE "CSAVEM A$,&H0600,
     &H1DFF" FOR CASSETTE SYSTEM
910 SCREEN 1,0
920 RETURN
930 '****************************
940 'SUBROUTINE TO READ GRAPHICS
     SCREEN
950 SCREEN 0,0
960 CLS
970 INPUT "READ FILE NAME"; A$
980 IF A$="" THEN 1010
990 LOADM A$
1000 'USE "575 CLOADM A$" FOR
      CASSETTE SYSTEMS
1010 SCREEN 1,0
1020 RETURN
```

CORRECTIONS

"Cooking With CoCo" (October 1984, Page 180): Colin Stearman advises us that there is a problem with the FLEXIKEY routine in his program. To correct this bug, change the following lines in the source code:

825 - Replace with these two lines:

```
ABX

LDA   ,X
```

882 - Replace with these two lines:

```
ABX

TST   ,X
```

"Getting On The Right Track" (July 1985, Page 33): Colin Stearman also informed us there is a minor problem in Listing 2 that causes an 80-track drive to access only 142 granules. Insert the following line to correct the problem:

```
885 IF TRACKS=80 AND VP=142 THEN

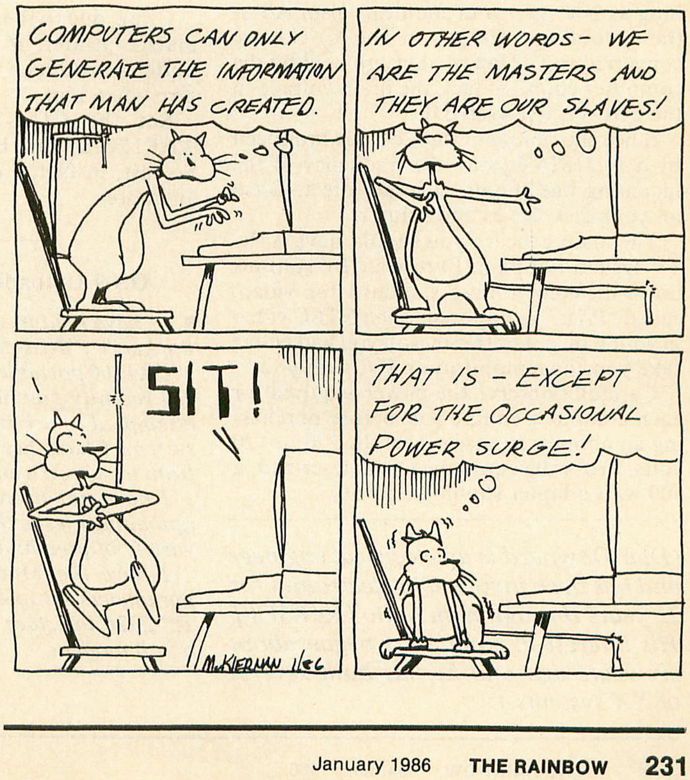
 VP=156
```

"If Your Horse Comes In First, You Lose" (November 1985, Page 129): Two readers, Wilf Sloan and Scott Kelly, suggested fixes for a problem in this program that causes incorrect scoring. Change lines 1040 and 1280 to read as follows:

`1040... SC(1)=0...` (change this statement only)

`1280... PK=253 ...` (change this statement only)

CoCo Cat


COMPUTERS CAN ONLY GENERATE THE INFORMATION THAT MAN HAS CREATED.
IN OTHER WORDS - WE ARE THE MASTERS AND THEY ARE OUR SLAVES!
SIT!
THAT IS - EXCEPT FOR THE OCCASIONAL POWER SURGE!
M. KIERNAN 1/86

RAINBOWTECH

DOWNLOADS

CoCo Goes To Spain

By Dan Downard
Rainbow Technical Editor

• *I am a member of the United States Air Force and have been assigned to a four-year tour of duty near Madrid, Spain. The voltage over there is 220 with 50Hz. While I am sure I can buy converters for the voltage, I don't believe there is much I can do about the 50Hz cycles to convert them to 60Hz.*

Can you give me the name and/or address of who I can contact to convert my equipment? I have a Gemini-10X printer with a Blue Streak interface, and a 64K Color Computer 2 with a Radio Shack disk drive and cassette recorder.

Delbert R. Tucker
Hurlburt Field, FL

Delbert, I don't see any reason why you can't take the whole computer to Spain, as long as you take your monitor, also. All of the incoming voltages in the CoCo are converted to DC before they are used by the computer chips. In fact, the main voltage in the CoCo is five volts DC.

Since the timing in the CoCo is produced by a 14.31818 crystal, the frequency of the incoming line should have no effect. Ditto on your disk drives and printer.

The main concern you should have is the TV system in Spain. European TV stations use a different timing standard for video, called "PAL," as opposed to the NTSC video in your CoCo. For this reason you had better take your own monitor, or TV, with you.

Carefully observe the power required for each computer component before purchasing an adapter (transformer) for 220 to 120 volts. From the equipment you described, a 500 watt adapter should be plenty.

(Dan Downard is an electrical engineer and has been involved in electronics for 25 years through ham radio [K4KWT]. His interest in computers began about six years ago and he has built several 68XX systems.)

Quick Print

• *I have a Gemini-10 printer with a CCP-1 serial interface from Botek Instruments. When I try to* `LLIST` *or screen dump something, I want [my printer] to start printing as soon as it starts to receive the information, not when the buffer is full, as it does now. I followed the instruction manual on setting the DIP switches so it would print every time it receives a CR code, but it still fills the buffer first. Could it be the interface that does this? Could you tell me how to make it not do that?*

Craig Fischer
Renton, WA

Craig, due to the fact that you have a dot-matrix printer, it is necessary to fill the buffer before each line is printed, but I can give you a hint.

Set the CCP-1 to 9600 Baud and `POKE150,1`. Your buffer will fill a lot faster. So fast, in fact, I doubt you will notice it anymore.

OS-9 Uploading from the M100

• *I have read in your column and in Dale Puckett's ["Kissable OS-9"] of using the Model 100 portable together with CoCo OS-9. I recently purchased the M100 and have attempted to use it with my 64K OS-9 disk system. I have been able to download files from the CoCo using* `list filename>/t1`.

I have not been successful, however, in uploading files to the CoCo. I've tried a wide variety of possibilities.

I have the Model 100 communications parameters set at 48N1E,10. I am using an RS-232C interface cable that was made with a null modem.

Allan S. Wysocki
Seven Valleys, PA

I have two suggestions, Allan. The firs one works because I have done it; the secon is just a thought.

I know of at least two terminal program for OS-9. Both support uploading an downloading of files. *Color Connection* i marketed by Computerware and *CMODEM* is available from Computer System Consultants. Both work well with OS-9 an have been reviewed in THE RAINBOW. I hav used both programs to upload files to th CoCo.

The other suggestion is to use the Mode 100 as a remote terminal for the CoCo usin the TSMON& command. By using th BUILD command, you should be able t upload any files with no problems whatsoever.

Global Search and Replace

• *I work in a large IBM mainframe sho where all source programs are stored on program management library that we acce to make changes to our programs. F example, we can scan for every occurren of* GOTO 1700 *and it shows every line i which it is contained. We can then sa "replace all* GOTO 1700 *occurrences wi* GOTO 2100*" and the changes automatical take place.*

Is there a BASIC *editor program on t market today that can do this, or one th can at least show which lines contain t phrase we want to search for? It would su make mass program modifications easier.*

Phil Raleig
Augusta, M

I hope I understand your question, Phi since renumbering all GOTOs and GOSUBs automatically accomplished with the RENU command, which is part of the Extende BASIC editor.

If you have a need to do exactly what yo say, the easiest way is to use a text editor, or a word processor with a global search and replace feature. Most CoCo word processors I am familiar with have this facility.

To use a word processor with a BASIC program, you first have to save the BASIC program in an ASCII format, but it's all downhill from there.

Preferable POKE

- *A better* `POKE` *to disable the* `LIST/` `LLIST` *commands is* `POKE383,62`. *This* `POKE` *clears the screen and returns the OK prompt.*

Your `POKE383,158` *requires pressing the BREAK key to stop the scrolling of one nonexistent line of garbage.*

A `POKE383,126` *re-enables the* `LIST/` `LLIST` *commands, restoring the original value to 383.*

Keith Peters
Chicago, IL

Thanks for the tip, Keith. I'm sure a lot of our readers can use it.

Accurate Access

- *In the first "Downloads" column, you gave some advice regarding "offset loading," which required the start, exec and end address of a program. I have a utility that, amongst other things, gives this very information, but I have discovered it is not providing me with accurate addresses, which explains some of the difficulties I have experienced.*

Can you please tell how to accurately access the necessary addresses in any machine language, or binary, program, in order that one can relocate, especially above Disk BASIC, when such becomes necessary.

Ray S. Preston
Rarotonga, Cook Islands

To find the start, end and exec address of a binary disk file, you need to know how the data is organized on the disk, Ray. If you examine a machine language disk file you will notice the following:

Bytes 2 and 3 — Length of the program
Bytes 4 and 5 — Starting address
Last two bytes in file — Execute address

Using this information, you can determine the addresses desired. If you would like a nice directory listing, try the following program:

Sample Run of *DIRECT/BAS*

```
DISK NAME:

NAME     EXT TYPE  FMT G1 #G  #S START,END  ,EXEC
U        BAS LOAD  BIN 32  1   6
TW64     BIN LOADM BIN 33  5  37  $1E28,$1EA2,$1E28
F            LOADM BIN 30  2  13  $0FE6,$1C52,$0FE6
DWNLDS   JAN DATA  ASC 28  2  12
S        BIN LOAD  BIN 38  2  13
S        XXX LOAD  BIN 26  2  12
DIRECT   BAS LOAD  BIN 40  1   7
   TOTAL                  15 100
   FREE                   53
```

The listing:

```
10 'DISK DIR LISTER-RAINBOW MAG
20 'REWRITTEN BY DAN DOWNARD 2/8
30 CLEAR1500:DIM GR(68)
40 INPUT"PRINTER(Y/N)";P$:IFP$="
50 FT$(0)="LOAD":FT$(1)="DATA"
60 FT$(2)="LOADM":FT$(3)="EDIT"
70 AF$(0)="BIN":AF$(1)="ASC"
80 U1$="%        % % % %   % % % #
90 U2$=" ## ###"
100 U3$="   %   %
110 PRINT#P:INPUT"DISK NAME";D$
120 PRINT#P,"DISK NAME: "D$:IFDA
130 IFP=-2 THENPRINT#-2
140 PRINT#P,"NAME      EXT TYPE
150 DSKI$ 0,17,2,A$,B$:FB$=LEFT$
160 FORI=1TO68:GR(I-1)=ASC(MID$(
170 FORX=3TO11
180 DSKI$ 0,17,X,AA$,BB$
190 AA$=AA$+LEFT$(BB$,120)
200 FORN=0TO7
210 NA$=MID$(AA$,N*32+1,8):EX$=M
220 FG=GR
230 FT$=MID$(AA$,N*32+12,1):AF$=
240 IF LEFT$(NA$,1)=CHR$(0) THEN
250 IF LEFT$(NA$,1)=CHR$(255)THE
260 AF=ASC(AF$)AND1
270 FORI=1TO68
280 IF GR(GR)<128THEN GR=GR(GR):
290 IF ASC(FT$)=2 THEN420
300 PRINT#P,USINGU1$;NA$;EX$;FT$
310 GN=1:SN=0
320 GV=ASC(MID$(FB$,FG+1,1)):IF
330 GN=GN+1:SN=SN+9:FG=GV:GOTO3
340 SN=SN+(GV AND&H3F):PRINT#P,U
350 GT=GT+GN:ST=ST+SN
360 IF ASC(FT$)=2 THEN PRINT#P,T
370 PRINT#P
380 NEXT N,X
390 PRINT#P,USINGU3$;"TOTAL";GT;
400 PRINT#P,USINGU3$;"FREE";68-G
410 GOTO 110
420 LG=GR(GR):LS=LG AND 31:LL=GR
430 LB=ASC(MID$(AA$,N*32+16,1))
440 IF FG<34 THEN TN=INT(FG/2) E
450 SN=1+(FG AND 1)*9
460 DSKI$0,TN,SN,A$,B$
470 BP=ASC(MID$(A$,4,1))*256+ASC
480 BP$=HEX$(BP):BP$=STRING$(4-
490 EP=BP+ASC(MID$(A$,2,1))*256+
500 EP$=HEX$(EP):EP$=STRING$(4-
510 IF LL<34 THEN TN=INT(LL/2) E
520 SN=(LL AND 1)*9+LS
530 DSKI$0,TN,SN,A$,B$:A$=A$+LEF
540 EA=ASC(MID$(A$,LB-1,1))*256+
550 EA$=HEX$(EA):EA$=STRING$(4-
560 GOTO 300
```

It's not just

CHILD'S PLAY

but a total application software series.

It's a WORD PROCESSOR. It's a DATA BASE. It's a SPREADSHEET. And each program of the CHILD'S PLAY software series is available in three different levels of sophistication so you can custom fit CHILD'S PLAY to your individual needs.

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It took us a year and a half to complete the CHILD'S PLAY series. Our goal was to produce software easy enough for a child to use, yet versatile enough for the home or professional user. The end result is software so easy, so much fun for everyone to use, it's like CHILD'S PLAY.

A Mouse and Click-Down Menus

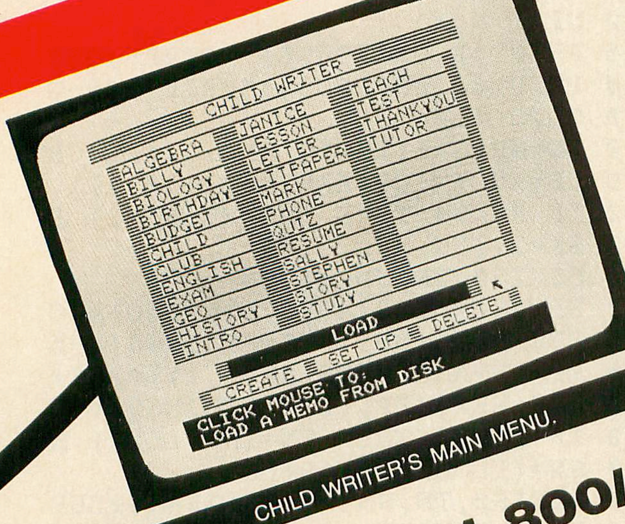
CHILD WRITER, our elementary word processor, is currently being used in schools by second grade children with amazing ease. Teachers tell us that kids are fascinated with the total control they have with a mouse. Just point and click! And we incorporated click-down menus to eliminate having to memorize dozens of commands. Simple instructions are right there on the screen, but only when you want them. Click the menu in when you need help and click it out when you don't. CHILD WRITER is not only easy to use, it's more fun and powerful.

Does your word processor underline text on the screen? All of the CHILD'S PLAY word processor programs do. For the first time you can reproduce on paper exactly what you've created on the screen. It's neat!

More Sophistication

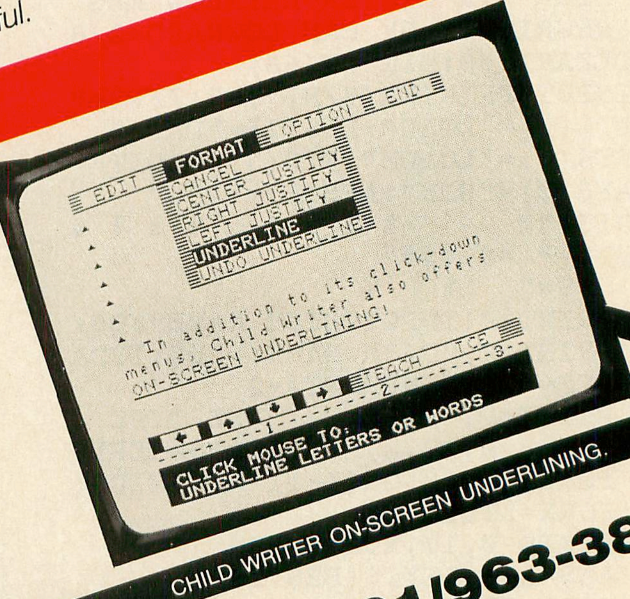
We could have stopped developing when we completed CHILD WRITER, but we knew that someone always wants more. So we developed MEMO WRITER, designed for the home user. And soon, we will have BUSINESS WRITER, the ultimate word processor designed for professional use.

MOUS


CHILD WRITER
ALGEBRA
BILLY
BIOLOGY
BIRTHDAY
BUDGET
CHILD
CLUB
ENGLISH
EXAM
GEO
HISTORY
INTRO
JANICE
LESSON
LETTER
LITPAPER
MARK
PHONE
QUIZ
RESUME
SALLY
STEPHEN
STORY
STORY
STUDY
TEACH
TEST
THANKYOU
TUTOR
LOAD
DELETE
CREATE
SET UP

CLICK MOUSE TO:
LOAD A MEMO FROM DISK

CHILD WRITER'S MAIN MENU.


EDIT
FORMAT
OPTION
END
CANCEL
CENTER JUSTIFY
RIGHT JUSTIFY
LEFT JUSTIFY
UNDERLINE
UNDO UNDERLINE
TEACH
TCE

In addition to its click-down menus, Child Writer also offers ON-SCREEN UNDERLINING!

CLICK MOUSE TO:
UNDERLINE LETTERS OR WORDS

CHILD WRITER ON-SCREEN UNDERLINING.

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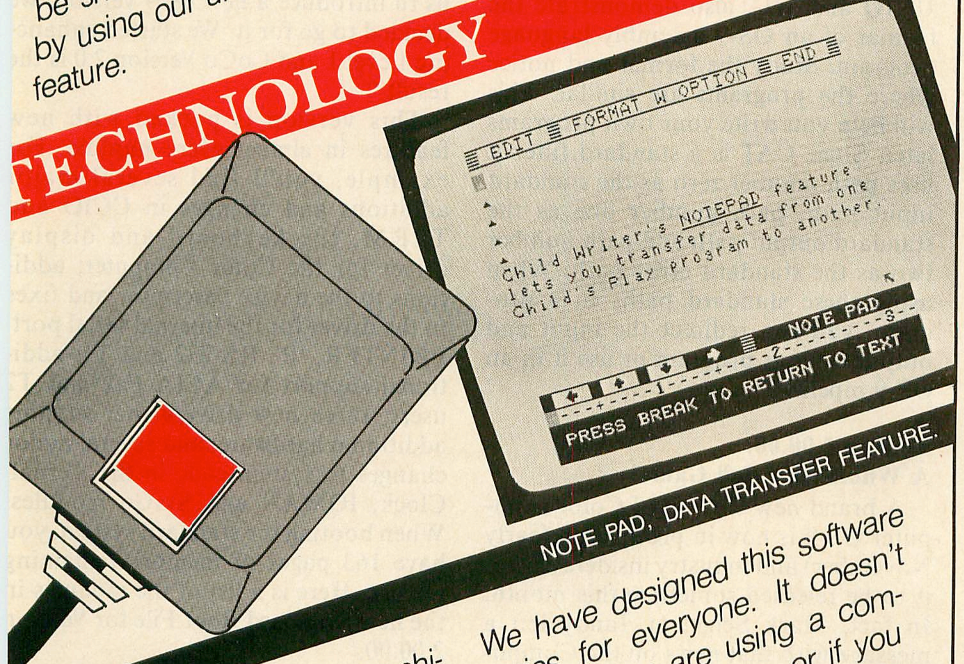
TECHNOLOGY



Child Writer's NOTEPAD feature lets you transfer data from one Child's Play program to another.

PRESS BREAK TO RETURN TO TEXT

NOTE PAD, DATA TRANSFER FEATURE.

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KISSable OS-9

Four Easy Assembly Language Experiments

By Dale L. Puckett
Rainbow Contributing Editor

Since this is the Beginners issue, we are publishing four short and useful assembly language programs you can experiment with while shaking your fear of the OS-9 assembler. They come from a fellow beginner, 17-year-old Kevin Kuehl, a senior at Morgan Township High School in Valparaiso, Indiana. He has been using OS-9 exclusively on his CoCo 2 since May and uses two 40-track drives stepping at six ms. Kevin got the courage to tackle assembly language after studying the programs submitted by Tim Harris earlier this year.

Kuehl's programs will help you on two fronts. Since we have published several high level language versions of the same programs in earlier columns, you will be able to compare the high level version of a program to the assembly language version. By doing this, you can learn how to code several common programming constructs in assembly language. You'll find out how to open and close files as well as how to read or write characters from them using standard OS-9 I/O system calls. You'll also learn how to check for any errors returned by OS-9 system calls and how to send error messages and prompts to your terminal.

The listings, which include the UNIX-like utilities CAT, CODE, UNIQ and WC, also demonstrate the format of an OS-9 assembly language program. Study the format and notice where the programs are similar. This will help you write your own programs later. Since CAT is a standard filter it uses path number zero as the standard input path, path number one as the standard output path and path number two as the standard error path. When using these standard paths in a program, you can redirect the input and output of your program or use it in an OS-9 pipeline.

Version 2.00.00: A Whole New Ball Game!

A brand new version of Color Computer OS-9 is now in production (early November) and industry insiders expect it to be released sometime this month. In fact, Mark Seigel at Tandy left a message with that news on the CompuServe OS-9 SIG in late October. Because the new release was so close, Tandy agreed to let Microware programmers talk about it at the Fourth Annual OS-9 Seminar. With this nod from Fort Worth, Mark Hawkins, Tim Harris and Todd Earles took the ball and ran. They scored many points during a Color Computer OS-9 session that drew nearly three times as many people as the same session in 1984.

Hawkins, who has worked with the Color Computer OS-9 project since he came to Microware three years ago, gave a brief overview of the project. "Version 1.01 was mainly for maintenance and we fixed a few bug fixes," he said. "Then, early in 1985 Tandy decided they wanted us to do a new version of OS-9 for the Color Computer. Since this was the best market for us to introduce a new 6809 version, we decided to go for it. We started enhancing Level 1 and CoCo Version 2.0 is the result."

This version is packed with new features in almost every module. For example, you'll find several major additions and changes in CCIO and TERM, the keyboard and display driver for the Color Computer; additions to the device descriptor and fixes to the driver for the internal serial port PRINTER, 'P', RS-232 and T1; additional support for ACIA Pak and T2 users; three new drivers that support additional hardware; and several major changes to system code in the Kernal Clock, IOMAN and SysGo modules When booting the standard system, you have 163 pages of memory remaining for use. Here is a list of the modules in the new Standard Boot File for Version 2.00.00.

People at the session noticed some of the changes as soon as they walked in the room. The Microware programmers had plugged their Color Computer into an Electrohome video projector. An 80-column screen projected a clear image on the large screen. As it turned out, the 80-column card was a prototype.

"We do not know if Tandy has committed to produce this card or not," Hawkins said. "They only told us that if they put an 80-column card on the market, it will work like this." At that point a Tandy employee attending the session said that an 80-column card is available through their express order program. After watching the demo speculators in the crowd insisted that it must be the PBJ *Word-Pak*, because the output character stream is written to the

---

(Dale L. Puckett is a free-lance writer and programmer who has worked with the Motorola family of microprocessors since 1976. He is the author of The Official BASIC09 Tour Guide, *and co-author, with Peter Dibble, of* The Official Rainbow Guide to OS-9. *He is a chief warrant officer in the U.S. Coast Guard and lives in Alexandria, Va.)*

QT STEALS THE SHOW!!

QT steals the show at Microware's OS9 Seminar!!! There were more QT's at the seminar than any other computer! The QT was everywhere. Microware used one for registration. The OS9 Users Group used two. Other companies used them to demonstrate their software. The QT has become THE computer for OS9/68K!

FHL announced five new products at the OS9 Seminar:

QT 20 - 68020 based computer system. The **QT 20** is based on the powerful 68020 microprocessor. The **QT 20** is a full 32 bit computer with 2048K RAM running at 12.5 mhz. Two **QT 20** prototypes were being shown with production expected to begin in late December 1985. Price for a QT 20 with a 20 meg hard disk is 5195 without software and 6995 with software. Send for more details.

Mint^{tm} Dental Office System. **Mint^{tm}** combines the **QT** computer with FHL's Dental Office software to create the most powerful and cost effective system available today. **Mint^{tm}** provides Multi-User power at PC prices. Complete systems start at 9,995. Send for complete brochure with sample reports.

FHL Office System with QCom. The **FHL Office System** is a large group of programs written in Sculptor+ for OS9/68K. They include: Invoice/Point of sale, Purchase Order with mini inventory, Mailing List System, Phone Date File, Multi-Key Card file, Notebook, and Tri-File sales lead package. The system sells for $1,700 but is included with the QT along with the Sculptor+ runtime,which sells for $175. **QCom** is a communications program with XModem file transfer that sells for $150 by itself, but it is also included with each QT.

Sculptor+ Microprocessor Developments Ltd. and FHL have made the **Sculptor+** Software Development System available for OS9/68K. The development was done on FHL's QT computer system, (of course). **Sculptor+** offers automatic program generation, a query program and development menu. The system sells for $995 unless you own a QT. QT owners can get **Sculptor+** for only 695! Send for details.

QT Certified Developer Program. This program is intended for software programmers who plan to develop QT applications with the QT. The program offers these features: Special developer price for QT development systems, Free promotion to the 16,00+ readers of **'QT News'**, Access to inside information via the **'Developers Newsletter'**. Send or call for an **'QTCD'** application today, it's FREE!

Frank Hogg Laboratory, Inc.
770 James Street
Syracuse NY 13203
315/**474-7856**

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card serially, one byte at a time and no "screen" memory is needed in the Color Computer's memory space.

"It's pretty nice," Hawkins said describing the new version. "We could use a little more memory but that's always the case. When you add a new feature, you add several lines of code to a system. Even though we knew it wouldn't make people happy, we had to make it bigger. To solve the problem we started playing games — especially with CCIO. We split the old module into several different modules so you can load and use only the features you want."

Three separate CCIO modules include the main Module, CCIO, and two co-modules for output called "GRFO" and "CO32." With this new approach, CCIO now handles all the keyboard input, CO32 handles the output to the standard display and GRFO handles all the graphics output. CCIO is used for all character output, but when you want to send graphics output, you will need GRFO. Because it's needed less, GRFO is not always present in memory. Rather, Microware has stored it in the CMDS directory so it can be loaded when you need it.

New CCIO features include auto-key repeat on all keys, an audible beep when you type CLEAR G, and an ALT key that lets you generate international characters — it is accessed by holding down the SHIFT key and pressing the '@' key. CCIO also supports true lowercase characters on machines with the new VDG (the white ones that were built in Korea; they are marked "Tandy" instead of "Radio Shack"). The new approach also allows limited animation since you can allocate three graphics buffers and select between them.

Microware has added routines to erase a circle and flood or fill an area on the screen. You can now draw in the background color when working in the two-color mode. And here's another bonus feature: CCIO no longer needs to be in memory all the time. This means a system can be configured to come up on a terminal plugged into T2. If this is done, you will notice there is a little extra memory available for your programs.

Additions to the 'P' and T1 device descriptor, which define the internal serial (bit banger) port, let you select the Baud rate, word length, number of stop bits and parity from the device descriptor. This means it can now be changed using the TMODE utility. Bits zero through three of the Baud byte determine the Baud rate. Bit four is reserved for future use at Microware. Bits five and six determine the word length — a zero selects an eight-bit word and a one gives a seven-bit word. Bit seven sets the number of stop bits. A zero here means you want one stop bit and a one means two stop bits. Finally, bits zero through three of the Type bit are reserved for Microware's use, and bits four through seven determine parity.

A "terrible bug" that appeared in Version 1.01.00 has been fixed. You no longer need to have the hardware ACIA cartridge plugged in to make the internal bit banger port work. (So that's why I was getting those letters!)

Another nice change involves the printer drivers. Now when output is first directed to your printer, the system allocates storage for it. After the output is finished, the system deallocates that memory. This change eliminates one major source of memory fragmentation on Level 1 systems. By the way, the old patches for fixing the Baud rate will not work with Version 2.00.00 since Microware has moved everything. On the bright side, however, you won't need to change them. Microware has designed a new utility command called TunePort, which lets you fine-tune the bit banger port for your particular terminal or printer.

Hawkins moved toward a discussion of the new drivers for the hardware ACIA Pak by demonstrating another new and subtle feature. "Enter the debugger and link to the module T2," he said. "You'll notice a string that reads 'T2RM.' Change the '2' to an 'E' and you have TERM. This is how you change the device descriptor so OS-9 will start up on a terminal you have plugged into T2."

The new ACIA Pak drivers als support changing the Baud rate, wor length, number of stop bits and parit after startup by using TMODE. And they now support auto-answer modem by reading the DCD line to tell if a calle has hung up. When a hangup occurs OS-9 kills all process started by tha device so the next caller won't end u signing on where another caller has lef off.

"Version 2.00.00 includes support fo three additional pieces of hardware tha we don't know too much about," Hawkins said. "The hardware includes a 80-column card, a hard disk controlle and a modem pack."

Hawkins said this release is stil designed to run with the standar Tandy drives, but he noted that Microware has fixed up the SysGo module s it goes out and looks for a hard dis drive if it is present. You still must boo from a floppy, but if a hard disk i plugged into your system, OS-9 wil know it and automatically switch to it.

New drivers and device descriptors i this version include SSC Pak and SSC which allow speech or sound outpu through Tandy's plug-in speech cartridge; MOD Pak, M1 and M2, whic communicate with a 300 Baud ACIA cartridge addressed at $FF6C. Th cartridge is plugged into Slot 2 o Tandy's Multi-Pak. The standar ACIA Pak cartridge, which is addresse at $FF68, may also be modified to wor with this driver.

CO80 and TERM80 are used in plac of CO32 and TERM when you want t use the 80-column display card. An finally, CCHDISK, H0 and H1 are use to read and write data to a ne WD1000-TB1 controller board connected to a 15- or 35-megabyte har disk drive. These are the standard drive

Listing 1:

```
* CAT:  a UNIX-like CAT utility that concatenates files and sends them to
*          standard output
* 6809 Assembly Language
*
* Kevin Kuehl
* 806 Division Road
* Valparaiso, IN 46383
* October 20, 1985
*
* Calls:  cat file1 file2 >bigfile   combines "file1" and "file2" into the
*                                    file "bigfile"
*         cat file1                  just like the "list" command
*         cat <file1
*         cat >thisfile              just like the "build" command
*
 NAM Cat
 IFP1
 USE /D0/DEFS/OS9Defs
```

QT Price List

	QT	*QT Plus*	*QT 20*
Single Board Computer level	995.00	1495.00	2750.00*
1 80 Track DSDD Floppy	1595.00	2095.00	-
2 80 Track DSDD Floppy	1750.00	2250.00	3900.00*
2 80 Track DSDD Floppy w/software	-	-	5700.00
10 meg Hard disk and floppy	2695.00	3195.00	-
20 meg Hard disk and floppy	2995.00	3495.00	5195.00*
20 meg Hard disk w/software	-	-	6995.00

*A version of the 68020 Motorola Bug monitor is the only software that is included with these systems.

Note: The *QT 20* is available with and without the software package that is included with the *QT* and the *QT Plus*. The individual prices for the software are below:

OS9/68K OS with all utilities	350.00
Basic09 and Runb	250.00
Stylo with Mail Merge and Spell check	625.00
Dynacalc electronic spreadsheet	595.00
QCom communications with Xmodem	150.00
Sculptor+ run time	175.00
FHL Office System	1700.00
Total separate cost	3845.00

The ***QT*** , ***QT Plus*** and the ***QT 20*** w/software include the above.

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Pascal compiler	**400.00**
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20 meg upgrade	**1425.00**
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used by other Tandy systems. However, a separate interface card is needed for communication with the Color Computer's external bus. If you plan on using more than one hard disk drive, note that they must both be the same size.

At the system level, a new IOMAN module, more like the one in OS-9 Level II, gives up a device's static storage after the last path to a device has been closed. This means you will have less memory fragmentation problems on the Color Computer than on other OS-9 Level I systems. A bug in the system warm start routine has been fixed and you should now be able to reboot OS-9 successfully by pushing the hardware Reset button on the back panel.

Microware has added a VIRQ, or virtual interrupt, to Version 2.00.00. This change lets you tap the output of the clock module to generate interrupts for devices that do not generate them with hardware, or devices plugged into a Multi-Pak slot that do not have access to the CART line. It also means you can run without CCIO. You can make a system call that tells OS-9 how many clock ticks you want to pass before receiving a VIRQ. Additionally, it can be set to give only one interrupt or a series of interrupts at regular intervals.

On the negative side, when combined, all of these changes mean the current versions of several popular programs will not run under Version 2.00.00. The most important of these are *SDisk*, the *CCDisk* replacement from D.P. Johnson and *O-Pak* from FHL. D.P. Johnson said he would have a new version of *SDisk* out as soon as he can get Version 2.00.00. However, Frank Hogg is so busy with his 68000-based QT, QT+ and QT-20 that he probably won't have time to redo *O-Pak*.

"Once you have made this call, you can put yourself on the polling table," Hawkins said. "Then after the specified number of ticks, the interrupt occurs and you can go look for your device. This lets you have devices that actually do generate interrupts, but use them a little differently. For example, with the MOD-Pak driver we use a VIRQ that has been set up to go look at the MOD Pak and check its status."

In addition to the new drivers, Microware has modified several programs in the utility command set and the results will make you smile. The modified commands configure themselves to the size of the screen you are using. For example, if you send a DIR listing to the standard Color Computer screen, it

```
 ENDC
 MOD catend,catnam,PRGRM+OBJCT,REENT+1,catent,catmem
**********************************
*
* DATA AREA
*
cr EQU $0D
bufsiz EQU 120
 ORG 0
pathno RMB 1
prmptr RMB 2
buffer RMB bufsiz
 RMB 250 Stack area
catmem EQU .
*
*
catnam FCS /Cat/
***********************************
*
* PROGRAM AREA
*
catent STX prmptr save the parameter pointer
 CLR pathno set to standard input
 LDA ,X get the first value in the parameter pointer
 CMPA #cr is it a carriage return?
 BEQ cat05 use standard output
 LDA #read. use READ access mode
 OS9 I$OPEN open the file
 BCS exit exit if error
 STA pathno save the path number
 STX prmptr save the parameter pointer
cat05 LEAX buffer,U point to input buffer
 LDY #bufsiz get its length
 LDA pathno get the path
 OS9 I$READLN and read a line of text
 BCS error branch if error
 LDA #1 use standard output
 OS9 I$WRITLN then write the text
 BCS exit exit if error
 BRA cat05 get the next line
error CMPB #E$EOF is error and EOF?
 BNE exit no, go
 LDA pathno else close file
 OS9 I$CLOSE
 BCS exit branch on error
 LDX prmptr yes, get old pointer
 LDA ,X get first part of parameter
 CMPA #cr is it a carriage return?
 BNE catent no, go
 CLRB else clear the error channel
exit OS9 F$EXIT exit program
 EMOD
catend EQU *
 END
```

Listing 2:

```
* CODE: an easy conversion program that converts ASCII character to their
*       HEXADECIMAL, DECIMAL, OCTAL, and BINARY equivalents
* 6809 Assembly Language
*
* Kevin Kuehl
* 806 Division Road
* Valparaiso, IN 46383
* October 20, 1985
*
* Call:  code A  displays the four values of ASCII 'A'
*
 NAM Code
 IFP1
 USE /D0/DEFS/OS9Defs
 ENDC
 MOD codeend,codenam,PRGRM+OBJCT,REENT+1,codent,codemem
codenam FCS /Code/
*********************************
*
* DATA AREA
*
declen EQU 3
```

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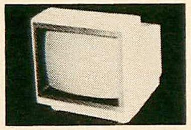

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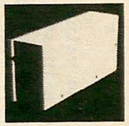

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appears in the familiar 32-column format. However, if you redirect that same DIR listing to a terminal attached to device /T2, you see an 80-column listing. Here is a listing of the utilities that have been modified to adjust to the screen size.

CONFIG
DIR
DUMP
LOGIN
MDIR
PROCS
TMODE
TSMON
XMODE

The most important new command for beginners is CONFIG, a menu-driven utility program that lets you create custom system disks. When you run CONFIG, select or deselect each available driver by pointing to each driver with an arrow moved by the Color Computer's arrow keys. After making your selection, CONFIG makes a new OS9Boot file.

A new utility command named INIZ has been added, which gives a way to initialize commonly used devices such as the printer, /P or an extra terminal attached to /T2. Initializing these devices eliminates another common source of memory fragmentation.

Another interesting fact came from a programmer who has seen the Tandy hard disk drives run on the Color Computer. He reported that they run faster on the CoCo than on some of the more expensive systems. Since hard drives are bound to be popular among Color Computer OS-9 users, Microware has already started to look for ways to back up hard disks.

Also during the special CoCo OS-9 session, Hawkins mentioned that the new keyboard drivers released with Version 2.00.00 return the correct value for the four empty grid (key) locations used by the mysterious keyboards that sold for $5 in red tag sales at many local Radio Shack stores. This keyboard reportedly has an alt key and a control key added. The control key is even on the "right" side of the keyboard — at the left end of the keys.

There is still no easy way to save graphics screens. You can get the job done, however, by writing a program that points to the start of the graphics screen memory and saves the following 6,000 bytes to a disk file. To display the saved file, you need to write a program to do the opposite. Point to the first address in the graphics screen memory area, open the saved file and store each byte in the file to memory one byte at

```
bitnum EQU 7
 ORG 0
value RMB 1
flag RMB 1
prmptr RMB 2
string RMB 30
 RMB 32 Parameter area
 RMB 200 Stack area
codemem EQU
********************************
*
* PROGRAM AREA
*
decval FCB 100,10,1
octval FCB 64,8,1
hexval FCB '0,'1,'2,'3,'4,'5,'6,'7,'8,'9,'A,'B,'C,'D,'E,'F
codent STX prmptr save the parameter pointer
codeloop LDB ,X get the character to be converted
 CMPB #$0D is it a carriage return?
 LBEQ exit yes, then end program
 STB value no, then save the value
 BSR hexcon and convert 'B'
 LDX prmptr and get the parameter pointer
 LEAX 1,X then bump it to next one
 LDB ,X+ and get the next character
 CMPB #$0D is it a carriage return?
 LBEQ exit yes, then go
 STX prmptr save the parameter pointer
 BRA codeloop and go for more
*******************************
*
* CONVERT TO HEXADECIMAL
*
hexcon LEAX string,U point to storage
 LEAY hexval,PCR point to table
 STB ,X+ save the value in string
 LDA #': and get a colon
 STA ,X+ save it in string
 LDA #$20 and get a space
 STA ,X+ save it in string
 LDA #'$ get a HEXADECIMAL representer
 STA ,X+ then save it
 ANDB #%11110000 mask off 4 bits
 LSRB and shift to very left
 LSRB
 LSRB
 LSRB
 LDA B,Y get the value in table
 STA ,X+ save A in string
 LDB value get value again
 ANDB #%00001111 mask of 4 bits
 LDA B,Y get the next value in table
 STA ,X+ save A in string
 LDA #$20 get a space
 STA ,X+ save it in string
 STA ,X+
***********************************
*
* CONVERT TO DECIMAL
*
 LDA #'D get an ASCII 'D'
 STA ,X+ save it and bump 'X'
deccon LDA #'0 get an ASCII zero
 STA ,X save in string
 STA 1,X
 STA 2,X
 LDB #3 get its length
 LDA value get the value to convert
 LEAY decval,PCR point to comparer
dcomp INC ,X add one to digit
 SUBA ,Y is digit correct?
 BHS dcomp no, go
 DEC ,X+ yes, correct digit
 ADDA ,Y+ correct value and bump Y
 DECB are we done?
 BEQ octcon yes, go
 BRA dcomp and go for more
**************************************
*
* CONVERT TO OCTAL
*
```

Sugar Software

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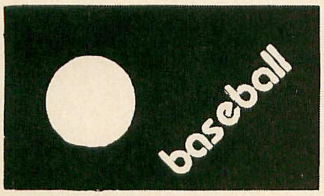
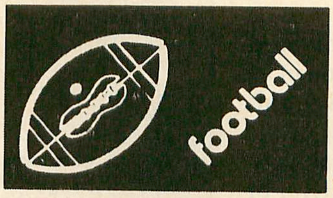
- Summary of the player, goalie, and opposing team's stats
- Track 20 individual player stats
- Summarizes 16 individual player stats
- Track 14 goalie stats
- Summarize 10 goalie stats
- Track 19 opposing team stats



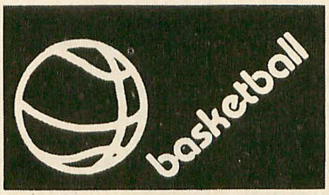
Baseball will provide:

- Mid-season entry, update and additions
- Correct and review all stats in file
- Correction on all input screens
- Raw dump of data to the printer — for the player, pitcher, and opposing team's files
- Summary of the player, pitcher and opposing team's stats
- Track 21 individual player stats with 18 cum stats per player
- Track 15 individual pitcher stats with 11 cum totals per pitcher
- Compile total team summary of 16 separate stats
- Compile total pitching summary of 11 stats
- Track 15 opposing team stats with 14 cummed stats



Football will provide:

- Mid-season entry, update and additions
- Correct and review all stats in file
- Correction on all input screens
- Raw dump of data to the printer — for the player and opposing team's files
- Summary of the player and opposing team's stats
- Track 90 individual player stats
- Summarizes 63 individual cum stats per player
- Summarize 17 cum team stats
- Summarize 28 cum opposing team stats
- Team summaries of 87 stats
- Comparative summary printouts 63 stats for your team
- Comparative summary printouts 62 stats for opposing team
- Over 350 possible stats!

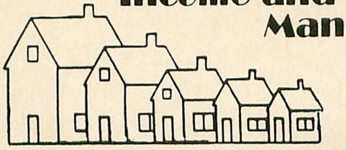


Basketball will provide:

- Mid-season entry, update and additions
- Correct and review all stats in file
- Correction on all input screens
- Raw dump of data to the printer — for the player and opposing team's files
- Summary of the player and opposing team's stats
- Track 22 individual player stats with 18 cum stats per player
- Summarizes 17 individual player team stats
- Compile opposing team summary of 19 separate stats

Rental Property

Income and Expense Management Package



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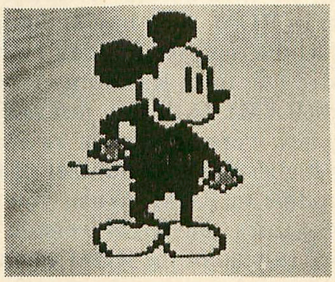
- Requires 16K



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a time. Make sure to increment the memory pointer each time you store a byte.

Concerning Tandy's policy of hard coding device-specific information in its Color Computer versions of OS-9, this practice is strictly taboo in most of the OS-9 community; professional programmers write their code so a driver or other program always reads device-specific parameters from an OS-9 device descriptor and adjusts to them. Now, it appears Tandy officials have realized they may trap themselves in a corner and not be able to stay compatible with their own rapidly changing product line if they continue this policy. We have about a 50 percent chance of seeing Tandy start to use device descriptors within the next year.

Random OS-9 Programming Tips

We picked up several good tips in Des Moines that we thought we should share here. For example, if you are working in a multi-user, multiterminal environment, don't unlink a module more times than you have linked to it. If you do, havoc will be created with other users on the system.

Here's another OS-9 characteristic that is easy to forget. It is impossible to unlink anything in the kernal — generally, this means anything that is stored in your OS9Boot file. "We have assumed you intend to keep any file that is stored in your boot file in memory," Hawkins said. "Also, don't forget that any module which appears in Read-Only Memory when you boot the system is also assumed to be in the boot file and may not be unlinked."

That reminds me of another OS-9 trick. If you have an old version of a program in ROM, then buy an update on a disk, the new version can be run by loading it into Random-Access Memory (RAM). To do this, just assemble the new version with a revision number higher than the number of the same module in ROM. When you do this, OS-9 uses the RAM version of your code instead of the ROM version.

Here's another tip we sometimes forget. When first booting up your Color Computer — especially if you are using /TERM for receiving from the standard input and writing to the standard output path — remember that the process descriptor gets its information about the terminal from the OS-9 device descriptor. However, once this information is stored in the process descriptor, processes started by the original pro-

```
octcon LDA #$20 get an ASCII space
 STA ,X+ and save it in string
 STA ,X+ and again
 LDA #'O get an ASCII 'O'
 STA ,X+ and save it in string
 LDA #'0 get an ASCII '0'
 STA ,X and save it in string
 STA 1,X
 STA 2,X
 LDB #3 get length of OCTAL number
 LDA value get the value to be converted
 LEAY octval,PCR point to the comparer
ocomp INC ,X add one the ASCII number
 SUBA ,Y decrement the value to be converted
 BHS ocomp if it is not correct, then go
 DEC ,X+ correct the digit
 ADDA ,Y+ and correct the number
 DECB are we done?
 BEQ bincon yes, then convert to binary
 BRA ocomp no, then go for more digits
*************************************
*
* CONVERT TO BINARY
*
bincon LDA #$20 get an ASCII space
 STA ,X+ save it in string
 STA ,X+
 LDA #'% get a BINARY representer
 STA ,X+
 LDA #'0 get an ASCII zero
 CLRB clear the counter
store STA B,X save value in string
 INCB add one to offset
 CMPB #bitnum are we done?
 BLS store no, go
 LDA #%10000000 get the flag
 STA flag and save it
bincomp LDA value get the value
 BITA flag check the flag bit
 BEQ branch yes, go
 LDA #'1 no then it is a ONE
 STA ,X and save in string
branch LEAX 1,X point to next part of string
 LSR flag are we done?
 BNE bincomp no, go
 LDA #$0D get a carriage return
 STA ,X and save it
write LEAX string,U point to the string
 LDY #30 get its length
 LDA #1 use standard output
 OS9 I$WRITLN write the string
 BCS error branch on error
 RTS and return home
exit CLRB clear the error channel
error OS9 F$EXIT exit program
 EMOD
codeend EQU *
 END
```

Listing 3:

```
* UNIQ: a utility to remove consecutive identical lines of input
* 6809 Assembly Language
*
* Kevin Kuehl
* 806 Division Road
* Valparaiso, IN 46383
* October 20, 1985
*
* Calls: uniq -R <thefile  removes the identical lines in "thefile" and
*                          prints the rest
*        uniq <thefile     removes the identical lines in "thefile" and
*                          prints them
*
 NAM Uniq
 IFP1
 USE /D0/DEFS/OS9Defs
 ENDC
 MOD uniqend,uniqnam,PRGRM+OBJCT,REENT+1,uniqent,uniqmem
uniqnam FCS /Uniq/
```

cess, usually a Shell, get their information about your device from the process descriptor. If you run TMODE, it modifies the most recent process descriptor, not your device descriptor. If you kill the process that started the TMODE, the changes that TMODE made will be removed. This means if you want to make a "permanent" change, XMODE must be run as quickly as possible after startup.

This happens because TMODE simply duplicates the original path descriptor and installs pointers to it. However, when you use I/O redirection, the system works differently and OS-9 opens three brand new paths when the Shell forks a new process from the command line. Thus, when using TMODE, you affect the same data structure, but, when using a redirected path, you do not affect the original.

On to the Future

Other excitement at Des Moines centered around Microware's new OS-9 network and the marketing agreement they signed with Hitachi, Ltd. and Graphic Software Systems, Inc. to support the new 63484 Advanced CRT

```
****************************************
*
* DATA AREA
*
stdinp EQU 0
stdout EQU 1
lf EQU $0A
cr EQU $0D
sp EQU $20
bufsiz EQU 120
 ORG 0
flag RMB 1
 RMB 2 Parameter area
buffer RMB bufsiz
storage RMB bufsiz
 RMB 200 Stack area
uniqmem EQU .
****************************************
*
* PROGRAM AREA
*
uniqent CLR flag remove := false
 LDA ,X+ get the parameter
 CMPA #cr is there a parameter?
 BEQ uniqread no, go
 CMPA #'- is it a dash?
 LBNE ending no, then syntax error
 LDA ,X else get the parameter
 ANDA #%11011111 and convert it to upper case
 CMPA #'R do we remove the repeats?
 BNE ending no, syntax error
 INC flag remove := true
uniqread LEAX buffer,U point to input buffer
 LDY #bufsiz get its length
 LDA #stdinp use standard input
 OS9 I$READLN read a line of text
 BCS uniqerr branch on error
 TFR Y,D put line length in D
 TST flag do we remove lines?
```

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Controller (ACRTC). This is the first time a semiconductor manufacturer and a software company teamed up to ensure there was a support unit for a system. The good news is that the drivers for the graphics chip are part of the standard OS-9 64K package, so all OEMs will get it with their system.

Additionally, Graphic Software Systems has written a graphics software support package called the Virtual Device Interface or VDI. The VDI has become an industry standard for immediate level graphics and has been adopted by both AT&T and IBM. It isolates the graphics code from the application code so graphics programs can be ported to many different systems. Microware is now porting the VDI to OS-9. It will run on the Hitachi chip first and other devices later.

OS-9 Net is the name of Microware's new network file system. It has a software-based network architecture that looks like the normal OS-9 file system. It is easy to use and directly compatible with all OS-9 application software, utilities and languages. Much of the work was done by programmers at Microware Japan.

```
 BEQ setup no, go
 LEAX buffer,U point to input buffer
 LDY #bufsiz get its length
 LDA #stdout use standard output
 OS9 I$WRITLN write the line
 BCS error branch on error
setup STB ,S save the line length
 LEAX buffer,U point to the input buffer
 LEAY storage,U point to the storage buffer
store LDA ,X+ get a letter
 STA ,Y+ save the letter
 DECB are we done?
 BNE store no, go
 LEAX buffer,U point to input buffer
 LDY #bufsiz get its length
 LDA #stdinp use standard input
 OS9 I$READLN read a line of text
 BCS uniqerr branch on error
 TFR Y,D put line length in D
 LEAY storage,U no, let's compare them
compare LDA ,X+ get a letter
 CMPA ,Y+ is this letter same?
 BNE write no, go
 DEC ,S are we done?
 BNE compare no, go for more
 TST flag do we remove doubles?
 BNE setup yes, go
 PSHS U save the pointer
 PULS U get the old pointer
 LEAX buffer,U point to input buffer
 LDY #bufsiz get its length
 LDA #stdout use standard output
 OS9 I$WRITLN write the line
 BCS error branch on error
 BRA setup and do again
write TST flag do we remove?
 BEQ setup no, go
 LEAX buffer,U point to input buffer
 LDY #bufsiz get its length
```

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The Microware System is based on a
ew Network File Manager (NFM)
iodule, which provides the same func-
ons as the familiar RBF module. This
ieans that files resident on a remote
ystem can be accessed in an identical
ianner as if they were resident on a
ocal disk. Each computer plugged into
ie network has a logical name. To open
file or device on a remote system,
imply add this logical name to the
tandard OS-9 pathlist. For example, to
st a file on a remote computer named
ALESDESK, you would type some-
iing like this:

```
S9: list /net/DALESDESK/d2/
ISSSTUFF/January.Mess
```

Operation of the network is transpar-
nt to you and additional file security
rotects files stored on each computer
ooked up to the network. Microware
iys that OS-9 Net is designed to be
ompatible with OMNINET, ETH
RNET, ARCNET and similar net-
ork systems.

On another positive note, OS-9 is
xtremely popular in Japan and Eu-
ope. There is an active OS-9 Users
roup in Japan, and Microware has six
istributors in Europe.

ext Month: A Sample Device Driver

Next month, we'll present a device
river and descriptor that will turn your
56K Banker from J & R Electronics
ito a RAM disk. Several people have
sked for sample device drivers and
escriptors, so we were happy when
Villiam Goode stepped forward and
ffered to share his public domain
ource code.

Additionally, we have a folder full of
iformation we had planned to run this
ionth until we stumbled on the Version
00.00 story in Des Moines. We'll try
work them in February along with
escriptions of *M-XY*, Bill Brady's new
eeware plotter program that generates
iarts from several different programs;
ews about *Printform*, a shareware
rint formatter from Frank Malaney in
ataskala, Ohio; and news of a great
fer on *Utilipak* from Stephen Gold-
erg of Bethpage, New York. How does
a utility sound?

If you have news about new OS-9
roducts, ideas, suggestions, listings or
uestions, please send them in. Al-
ough we cannot answer all individual
tters, we try very hard to get most of
e answers in "KISSable OS-9" —
oner or later. ☐

```
 LDA #stdout use standard output
 OS9 I$WRITLN write the line
 BCS error branch on error
 BRA setup go for more
uniqerr CMPB #E$EOF is error an EOF?
 BNE error no, then error exits
ending CLRB else clear error channel
error OS9 F$EXIT exit the program
 EMOD end of module
uniqend EQU *
 END
```

Listing 4:

```
* WC: a UNIX-like word count utility
* 6809 Assembly language
*
* CoCo OS-9 v. 01.01.00
*    Kevin Kuehl
*    806 Division Road
*    Valparaiso, IN 46383
*
* Options: -C character count only
*          -L line count only
*          -W word count only
*
* Calls: WC <file counts characters, lines, and words in "file"
*        WC file1 file2 counts characters, lines, and words in
*                       "file1" and "file2"
*
*  with GREP:
*  GREP the <file ! WC -L
*     count the number of times "the" is in "file."
*
 NAM WC
 IFP1
 USE /D0/DEFS/OS9Defs
 ENDC
 MOD wcend,wcnam,PRGRM+OBJCT,REENT+1,wcent,wcmem
wcnam FCS /WC/
*********************************
*
* DATA AREA
*
aflag EQU %00000111 sets option to count all three
cflag EQU %00000100 set option to count only characters
lflag EQU %00000010 sets option to count only lines
wflag EQU %00000001 sets option to count only words
outlen EQU 5 set length to five
lf EQU $0A
cr EQU $0D
sp EQU $20
bufsiz EQU 120 set length of buffer to 120
 ORG 0
ipath RMB 1
flag1 RMB 1
flag2 RMB 1
ctot RMB 2
ltot RMB 2
wtot RMB 2
prmptr RMB 2
ctotp RMB outlen
ltotp RMB outlen
wtotp RMB outlen
inpbuf RMB bufsiz
 RMB 200 stack area
 RMB 200 parameter area
wcmem EQU .
******************************
*
* PROGRAM AREA
*
wcent LDB #aflag set option list to all
 LDA ,X get the first character in parameter
 CMPA #'- is it a dash?
 BNE opnfile no, then open file and count all opts
 LEAX 1,X else bump 'X' to next character
 LDA ,X+ yes, get next letter
 ANDA #%11011111 convert to UPPER CASE
 LDB #cflag get character option mask
 CMPA #'C is it C option?
 BEQ opnfile yes, go
 LDB #lflag get line option mask
 CMPA #'L is it L option?
 BEQ opnfile yes, go
 LDB #wflag get word count option
 CMPA #'W is it W option?
 LBNE ending no, we have a syntax error. End program
******************************
*
* OPEN FILES FOR INPUT
*
opnfile CLR ipath set to standard input
 STX prmptr save the parameter pointer
 LDA ,X get the first character in parameter
 CMPA #cr is it a carriage return?
 BEQ count yes, go and use standard input
 LDA 1,X else get next character in parameter
 CMPA #cr is it a carriage return?
 BEQ count yes, go and use standard input
opnloop LDA #read. and set to READ access mode
 OS9 I$OPEN and open the file
 LBCS error branch if an error
 STA ipath no error, save the path number
 STX prmptr save the updated parameter pointer
***************************
*
* COUNT ALL OPTIONS HERE
*
count STB flagl save the flag
 STB flag2 save the flag for future use
 LBSR cnt count all amounts
cmsage LDB flagl get the flag
 CMPB #cflag do we count characters?
 BLO lmsage no, go
 SUBB #cflag yes, then correct the flag
 STB flagl save the new flag
 LEAX cmsg,PCR point to message
 BSR writeit write the message
 LDD ctot get character total
 LEAU ctotp,U point to storage
 LBSR convert convert 'D' to ASCII
 LEAX lnfeed,PCR go to next line
 BSR writeit and do it
 TST flagl are we completed?
 BEQ close yes, then end
lmsage LDB flagl get the flag
 CMPB #lflag do we count lines?
 BLO wmsage no, go
 SUBB #lflag yes, then correct the flag
 STB flagl save the new flag
 LEAX lmsg,PCR point to second message
 BSR writeit write the message
 LDD ltot get line total
 LEAU ltotp,U point to storage
 LBSR convert convert 'D' to ASCII
 LEAX lnfeed,PCR go to next line
 BSR writeit and do it
 TST flagl are we completed?
 BEQ close yes, then go
wmsage LDB flagl get the flag
 CMPB #wflag do we count words?
 BLO close no, go
 LEAX wmsg,PCR yes, point to message
 BSR writeit write the message
 LDD wtot get word total
 LEAU wtotp,U point to storage
 BSR convert convert 'D' to ASCII
 LEAX lnfeed,PCR point to the string
 BSR writeit go to the next line
*******************************
*
* CLOSE THE FILE AND GO TO NEXT ONE
*
close LEAX lnfeed,PCR point to the string
 BSR writeit separate this file from next
 LDB flag2 get the option flag
```

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```
 LDA ipath get input path number
 OS9 I$CLOSE no, then close the file
 BCS error branch on error
 LDX prmptr get the parameter pointer
 LDA ,X check the next character
 CMPA #cr is it a carriage return?
 LBNE opnloop no, then open another file
ending CLRB clear error channel
error OS9 F$EXIT exit the program
**********************************
*
* WRITEIT SUBROUTINE
*
writeit LDY ,X++ get length and bump X
 LDA #1 use standard output
 OS9 I$WRITE write the message
 BCS error branch on error
 RTS return from subroutine
**********************************
*
* CNT SUBROUTINE
*
cnt LDD #0 clear D
 STD ctot clear char total
 STD ltot clear line total
 STD wtot clear word total
cnt05 LEAX inpbuf,U point to  storage
 LDY #bufsiz get its length
 LDA ipath use standard input
 OS9 I$READLN read the line
 BCS cnterr branch on error
 TFR Y,D put char count in D
 ADDD ctot add in new characters
 SUBD #1 take carriage return out of line
 STD ctot save as new total
 LEAX 1,X move to second character
cnt10 LDA ,X+ move to next character
 CMPA #cr is it a carriage return?
 BEQ cnt15 yes, go
 CMPA #sp or is it a space?
 BNE cnt10 no, go
 CMPA -2,X do we have another word?
 BEQ cnt10 no, go for more
 LDD wtot get old word total
 ADDD #1 incriment by one word
 STD wtot save as new total
 BRA cnt10 go once more
cnt15 LDD wtot get final word total
 ADDD #1 incriment for last word
 STD wtot save final total
 LDD ltot get old line total
 ADDD #1 add last line
 STD ltot save as new total
 BRA cnt05 get next line
cnterr CMPB #E$EOF is error an eof?
 BNE error no, then error exists
 RTS return from subroutine
**********************************
```

```
*
* CONVERT SUBROUTINE
*
convert PSHS U save pointer
 TFR D,Y save the total
 LDA #'0 get an ascii 0
 STA ,U save it in the string
 STA 1,U
 STA 2,U
 STA 3,U
 STA 4,U
 LDA #5 get length of number
 PSHS A save length and pointer
 TFR Y,D retrieve total
 LEAX dectab,PCR get address of comparer
comp INC ,U add one to digit
 SUBD ,X is digit correct?
 BHS comp no, do once again
 DEC ,U correct the digit
 ADDD ,X++ correct number and get next comparer
 DEC ,s go to next digit
 BEQ return if done go
 LEAU 1,U else get next digit
 BRA comp go again
return PULS A,U get pointer
 LEAX ,U point to string
 LDY #outlen get its length
 LDA #1 use standard output
 OS9 I$WRITE write it
 LBCS error branch on error
 RTS return from subroutine
**********************************
*
* VALUES NEEDED BY CONVERT
*
dectab FDB 10000,1000,100,10,1
*********************************
*
* MESSAGES TO USER
*
cmsg FDB cmsglen
 FCC /Total number of characters is: /
cmsglen EQU *-cmsg-2
*
lmsg FDB lmsglen
 FCC /Total number of lines is:      /
lmsglen EQU *-lmsg-2
*
wmsg FDB wmsglen
 FCC /Total number of words is:      /
wmsglen EQU *-wmsg-2
*
lnfeed FDB lnfdlen
 FCB cr,lf
lnfdlen EQU *-lnfeed-2
 EMOD end of module
wcend EQU * end of program
 END
```

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By Richard A. White
Rainbow Contributing Editor

There are occasions when the need arises for a spreadsheet to look up or choose a value based on some other value. All CoCo spreadsheets provide OOKUP( ) to find values from a look-up table. *VipCalc* lds CHOOSE( ), which is used to select a value from a t included as arguments with the function call. *DynaCalc* cludes both LOOKUP( ) and CHOOSE( ) while adding NDEX( ), which is a different look-up function. It's teresting that the famous *Lotus 1-2-3* does not include NDEX( ), and its CHOOSE( ) is less adept than *Dyna-alc*'s.

Let's first address the question of why you would want e of these functions in the first place. Correctly calculat- g a sales tax comes immediately to mind. Most, if not all, les taxes set up breakpoints to standardize when the next nny is charged. Say a state has a five percent sales tax. he law might prescribe that two cents will be charged tween $.21 and $.40. If there is an invoice or sales slip rm set up in the spreadsheet, you would certainly want e computer to calculate the sales tax. Why use the mputer at all if you have to look up things in a table and pe them in?

Another use is to look up data to calculate income taxes. lid an *Elite*Calc* spreadsheet that uses the IRS schedules calculate income tax. The spreadsheet could have been ne so the user had to look the tax up in the tables and ter it into the spreadsheet. The spreadsheet procedure returns exactly the tax shown in the tables without error. That's more than we can regularly expect from people. Other uses include selecting quantity discount rates, selecting commission rates and the like. You could even devise a spreadsheet that enters an item's price automatically based on a stock number and order quantity.

The first function to discuss is @CHOOSE(Key,Arg1,Arg2, . . . ,ArgN). Key must be an integer number from one to 'N' or a cell reference that contains such a number. "Arg1" means argument one, which may be a number, formula or another function. The term "argument" means some acceptable entry. What it is depends on the procedure or function being used.

As an example, Wigits Inc. has set up a year-end bonus system based on years with the company. It starts at five percent and tops out at 15 percent for employees with more than 10 years with the company. A spreadsheet to calculate the bonus is shown in Figure 1.

Figure 1: Employee bonus spreadsheet

```
    [    A       ][    B    ][    C    ][    D    ]
1-
2-EMPLOYEE          SALARY      YEARS      BONUS
3-
4-Adams             20000           1   1000.00
5-
6-Jones             40000           5   4000.00
7-
8-Smith             60000          15   9000.00
The formula in cell D4 looks like this:
B4*(.05+@CHOOSE(C4,0,.01,.02,.....,.1,.1,...))
```

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Note that I did not include .03, .04, etc., and extra .1s, which would have to be included in a real function call. @CHOOSE( ) gets the key, in this case the value from the Column C cell, and counts through the list of data values. In Adams' case, @CHOOSE( ) looks no further than the first data item. To deal with Smith, there needs to be at least 15 data items. The @CHOOSE( ) function might get a bit long if the company had been in business for a while, so there are limits in using @CHOOSE( ) in this way.

The ability to include formulas and functions as arguments may be attractive if these are not too long and their number is limited. Both *VipCalc* and *DynaCalc* lets one use cells, and *DynaCalc* allows cell ranges for arguments. When this is possible, @CHOOSE( ) becomes much more powerful since the limit on how many characters can be in a cell formula can be avoided. It now looks more like the powerful multiple choice statements like CASE in PASCAL and C, or even `ON X GOSUB` from BASIC. To use these, the programmer must some way choose integers to identify the choice desired just as with @CHOOSE( ).

Figure 2 shows our familiar bonus spreadsheet with a look-up table added. The Column D cell formulas become a little simpler since we will use @LOOKUP( ) to get the right value from the table. Here's what a typical *DynaCalc* formula looks like:

```
+B4*(.05+@LOOKUP(C4,A10...A21))
```

The form of the @LOOKUP( ) function is @LOOKUP (Key,Cell Range). The key may be a number or cell reference and is sometimes termed the test variable. The Cell Range refers to at least two partial columns. The first coordinat A10 in our case, is the top of the comparison column. Tl second coordinate, A21, defines the bottom of that colum of cell references.

Figure 2: Employee bonus spreadsheet with look-up tabl

```
   [    A      ][    B    ][    C    ][    D    ]
 1-
 2-EMPLOYEE         SALARY     YEARS      BONUS
 3-
 4-Adams             20000         1    1000.00
 5-
 6-Jones             40000         5    4000.00
 7-
 8-Smith             60000        15    9000.00
 9-
10-          1           0
11-          2         .01
12-          3         .02
13-          4         .03
14-          5         .04
15-          6         .05
16-          7         .06
17-          8         .07
18-          9         .08
19-         10         .09
20-         11          .1
21-        100           0
```

DynaCalc allows for more than one column of data t be associated with a comparison column, a feature n included in *VipCalc* or *Elite*Calc*. Therefore, you ma identify the column you want to use. In our case, we ha only one column, so the data column is assumed to be tl one to the right of the comparison column. When usi more than one data column in *DynaCalc*, you name a c in the data column or row you want to use. You can nan the comparison column, which implies that it can be its ov data column. This works with the tax look-up table (Figu 3) and results in a smaller look-up table.

You need to be very clear on how a LOOKUP( ) functi works because it *does not* simply find the number in t key and get the value in the data column or row. Rath the comparison row or column searches for the largest val that is not greater than the key. The associated data val is returned. Now the 100 in Cell A21 of Figure 2 serves force any value greater than 11 to return the .1 val associated with 11. In the bonus spreadsheet, this means people with 11 or more years with the company get a percent of salary bonus. In this case 100 is large enough sin no one works for 100 years.

That all-time favorite, the federal income tax, provi an excellent opportunity to use LOOKUP( ). In fa LOOKUP( ) was designed to handle tax calculations.

The look-up table in Figure 3 provides all the data tl is needed for calculating federal income tax for marr couples filing jointly. It is expressly designed to ta advantage of *DynaCalc*'s ability to specify which colu is to be the data column. This arrangement takes much l space and memory than the multiple look-up tables in *Elite*Calc* tax spreadsheets. This means I can include 1040 filing status options in one spreadsheet rather th making separate spreadsheets for single and marr options.

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Figure 3: Look-up table for Schedule Y of the 1984 federal income tax

```
     [     A      ][    B    ][    C     ][    D    ]
 1-  1984 FED. TAX    SCHEDULE Y
 2-  Taxable Inc.   Rate      Precalc
 3-             0          0          0
 4-          3400        .11          0
 5-          5500        .12        231
 6-          7600        .14        483
 7-         11900        .16       1085
 8-         16000        .18       1741
 9-         20200        .22       2497
10-         24600        .25       3465
11-         29900        .28       4790
12-         35200        .33       6274
13-         45800        .38       9772
14-         60000        .42      15168
15-         85600        .45      25920
16-        109400        .49      36630
17-        162400        .50      62600
18-     100000000
```

Programming a spreadsheet to use that data is another atter. We will start with the fact that if your taxable income less than $50,000, you must use the tax tables and report e amount from there rather than the amount computed om the tax schedules. It turns out that the tax tables are id out in $50 increments and the tax shown is for the iddle of that range. If your taxable income is $28,010, you y tax on $28,025. The first task is to work over the taxable come so it returns a tax table tax.

```
     [   E   ]
 1-    28010      This is Taxable Income
 2-    28000      +100*@INT(E1/100)
 3-       10      +E1-E2
 4-       25      @IF(E3<50,25,75)
 5-    28025      +E2+E4
 6-    28025      @IF(E1<50000,E5,E1)
```

Cell E1 contains the taxable income. In E2 the integer nction @INT( ) is used to strip off whatever is less than n even hundred dollars, which is put in E3 by subtracting 2 from E1. The IF( ) statement in E4 checks if this is less an 50, in which case it substitutes 25. If it is 50 or larger, is returned. In E5 is the taxable income that calculates tax table value. However, if taxable income is equal to greater than $50,000, the calculation is performed on the nadjusted taxable income. The choice is performed by the ( ) statement in E6.

Why go through all this? Well, if you do write an income x spreadsheet, I want you to know about the tax table oblem so you get it right. Secondly, it illustrates the fact at you may need to do some pre-processing before using LOOKUP( ) function. Thirdly, it is another example of spreadsheet calculation that may give you an idea on how solve one of your spreadsheeting problems.

```
     [    E    ]
 7-       3465    @LOOKUP(E6,A3...A18,C18)
 8-      24600    @LOOKUP(E6,A3...A18,A18)
 9-        .25    @LOOKUP(E6,A3...A18,B18)
10-       4321    @ROUND(1,+E7+((E6-E8)*E9))
```

In cell E7, @LOOKUP( ) is used to find the precalculated tax on $24,600. The taxable income in E6 is less than 29,900 in A11 of the look-up table, so all lookups are done in Row 10. The desired data column is 'C'. In *DynaCalc*, all you need to enter is the 'C' and *DynaCalc* assigns the row number of the last row in the comparison column. Next we need to get the $24,600 so we can find the amount of income that is greater than this number. This is done in E8. Here, the comparison column (Column A) is also the data column. Next the tax rate on the incremental income over $24,600 is put in E9. Total income tax is calculated and rounded to even dollars in E10.

The *DynaCalc* form for @ROUND( ) is @ROUND (number of digits,X). 'X' is the number to be rounded. Number of digits is defined by using a power of 10. The best way to understand this is with these examples:

@ROUND(.01,123.456) = 123.46
@ROUND(1,123.456) = 123
@ROUND(100,123.456) = 100

Now we can see a pattern. Though .01 is a power of 10, it can also be read as specifying that the rounding occur in the second figure right of the decimal point. A '1' rounds in the one's column and 100 rounds in the 100's column.

DynaCalc's @ROUND( ) has another use that is not necessary in other spreadsheets. *DynaCalc* is very limited in its ability to format numbers. In particular, you can format a cell or window to integer, two decimal places or whatever number of decimal places the calculation produces. If you want to display only three decimal places, it cannot be done with the format command. However, you can use round to eliminate unwanted decimal places. For example, @ROUND(.001,X) provides a three decimal or less result. This works even when rounding range is larger than the number or the number of decimal places. In other words, you don't need to worry about returning >ERR<.

As noted, *VipCalc* and *Elite*Calc* versions of LOOKUP( ) are not as powerful since they do not allow designation of a data column. They assume the value to be returned is either in the column to the right or the row below the comparison.

Finally, there is another data management function that is only in *DynaCalc*. It is @INDEX( ), which looks for an exact match with a value in the comparison column or row. This is quite useful for returning a price with a given stock number, for instance. The ability to have a number of offset columns or rows provides the ability to choose a price based on quantity ordered. If the stock number is not included in the look-up table, @INDEX( ) returns NA for "not available." Note that @LOOKUP( ) is not a good function for this purpose because it is not looking for an exact match and can return a value for a number not in the table. ☐

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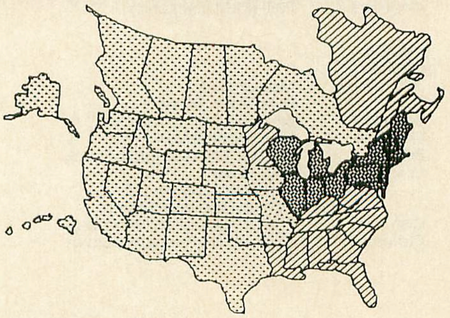

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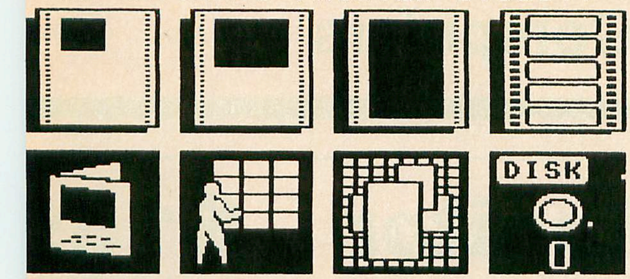

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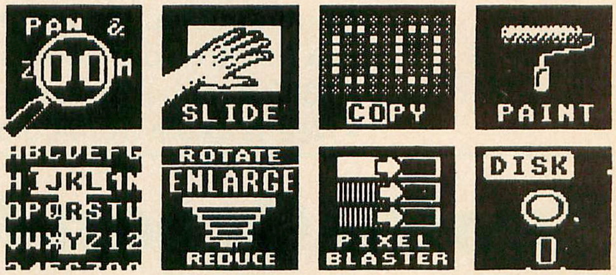

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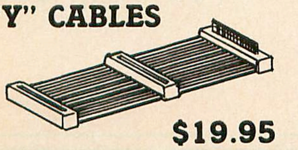

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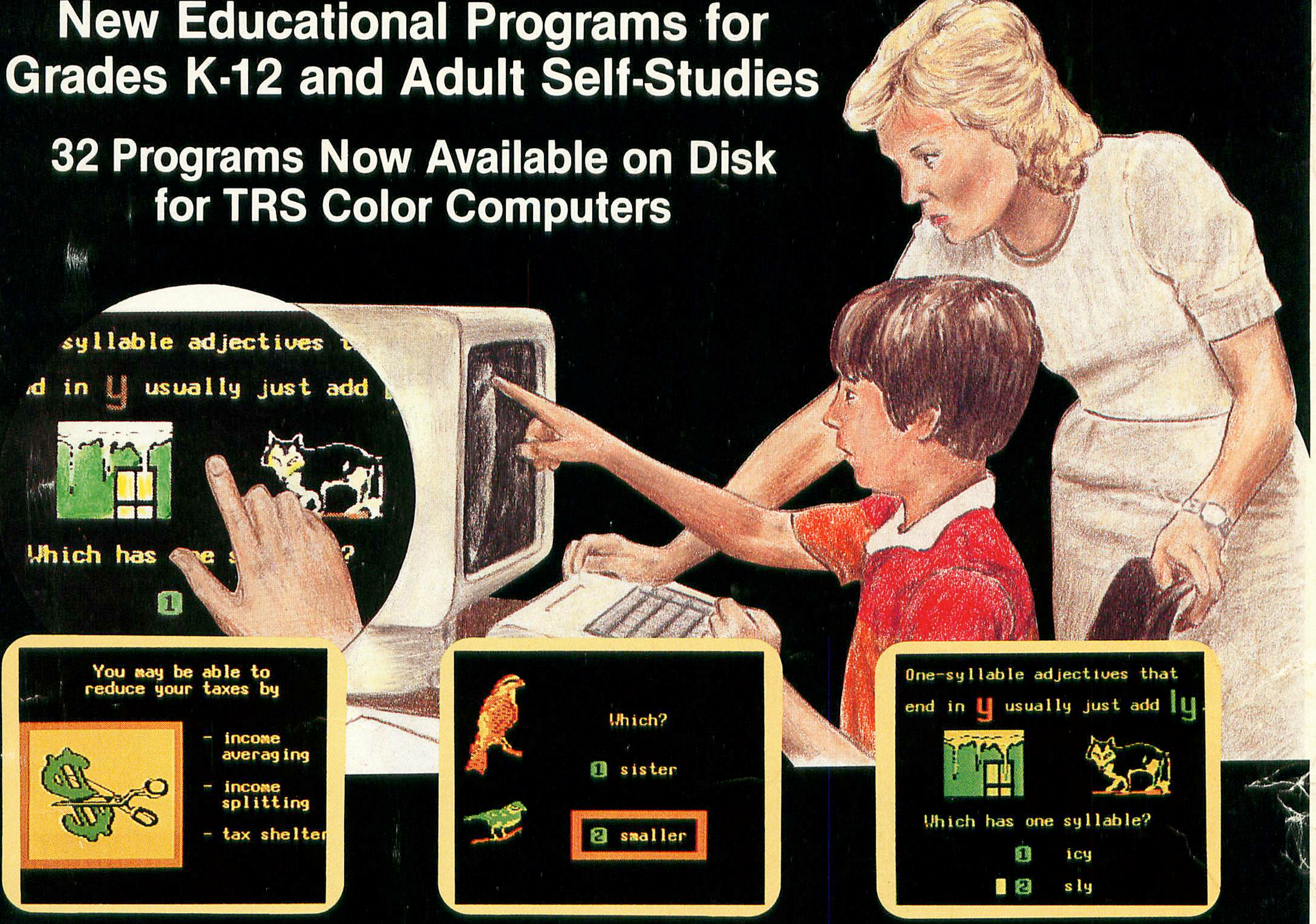

syllable adjectives
d in y usually just add
Which has one s ?
1
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- income splitting
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2 smaller
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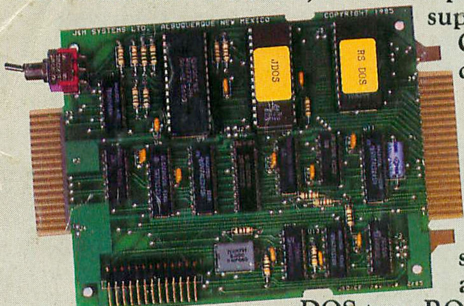

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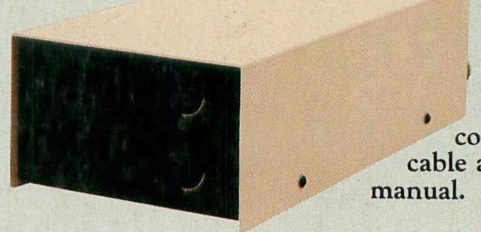

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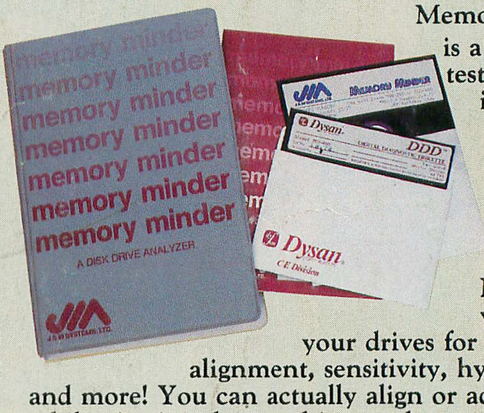

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